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September 1982

Consumer Demand for Red Meats, Poultry, and Fish

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**CONSUMER DEMAND FOR RED
MEATS, POULTRY, AND FISH**

**Richard C. Haidacher
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National Economics Division

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CONSUMER DEMAND FOR RED MEATS, POULTRY, AND FISH. Richard C. Haidacher, John A. Craven, Kuo S. Huang, David M. Smallwood, and James R. Blaylock. National Economics Division, Economic Research Service, U.S. Department of Agriculture, September 1982, ERS Staff Report No. AGES820818.

ABSTRACT

Red meats, poultry, and fish are the most important foods in most consumer's diets, and are of major importance to the Nation's agricultural economy. This report contains evidence that the U.S. demand structure for red meats, poultry, and fish is characterized by a high degree of stability, and that an overwhelming part of the variation in U.S. demand for these products can be explained by the economic factors of prices and income. Socioeconomic and demographic factors which are important determinants of individual consumer demand patterns are also identified; and their effects are measured, and assessed.

Keywords: budget allocation, consumer demand, own-price elasticity, cross-price elasticity, income elasticity, socio-economic and demographic effects.

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* This report was produced for limited distribution *

* to the research community outside the U.S. *

* Department of Agriculture. *

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SUMMARY

This study analyzes available historic data relevant to the demand for meat and provides economic information about consumer demand behavior for meat and meat products that is useful in addressing current meat demand issues. The approach of the study is unique, in that contemporary and traditional methods are used, and both time series and cross-section survey data are analyzed in a single report. Consequently, the study provides results from a broad perspective, in which the demand for meat is analyzed in the context of the aggregate U.S. demand for food and subsequently, through consecutive disaggregation down to home consumption of individual meat products based on observed household consumption behavior.

A major result from evaluation of the aggregate U.S. meat demand structure reveals that an overwhelming part of the variation in U.S. meat demand can be explained by changes in retail prices and consumer incomes. After taking account of significant socioeconomic and demographic factors which were also analyzed, the alleged importance of changes in other factors affecting meat demand would appear to be minor. This result also implies that historic aggregate U.S. demand relationships--for the composite categories of red meat, poultry and fish; and for individual meats such as beef and veal, pork, and chicken, are all characterized by a large degree of inherent stability.

With respect to income, measured aggregate demand responses show that the consumption of food, aggregate meat commodities, and individual meat commodities, increase with increases in consumer income. But, the income responses are inelastic at each level of commodity aggregation, implying that continued increases in consumer incomes will result in smaller proportions of income being spent on red meats, poultry, and fish. Conversely, reductions in income or in its rate of growth will have a smaller impact on these commodities than on those with income-elastic demands. Responses measures for household consumption indicate that at-home per capita consumption for the total of red meat, poultry and fish is not responsive to changes in income, although individual meat items exhibit a degree of responsiveness. The largest measured responses were associated with the higher priced meats and meat items associated with higher levels of processing. This implies that, although consumers may not choose higher quantities for total at-home meat consumption in response to increased income levels, they do shift consumption within the meat group on the basis of perceived quality.

With respect to prices, measured demand responses show that aggregate U.S. meat demand is not only responsive to changes in own-price, but also to changes in other food and nonfood prices. The measured effects of other food and non-food prices clearly demonstrate interrelatedness in demand across all commodities, and highlights the importance of considering the total budget allocation process of the consumer in explaining meat consumption behavior. Successive disaggregation, from the demand for food to the demand for individual red meats, poultry, and fish commodities, indicates that all meat items are characterized

by inelastic own-price responses. That is, regardless of the level of aggregation, an isolated 1-percent change in the price of any one meat commodity, either an increase or decrease, leads to a change in the quantity demanded of less than 1-percent in the opposite direction.

Household survey data on at-home consumption shows pronounced effects of selected socioeconomic variables. Per capita consumption tends to decline for larger families, and the 40-64 age group consumed more meat from home supplies than younger or older persons. There is also substantial variation in consumption by geographic region. Residents of the Northeast consumed and spent more per capita than similar consumers in other regions. Race is an important variable influencing at-home meat consumption. Blacks consumed approximately 62 percent more meat per person from home supplies than did non-blacks with similar nonracial characteristics. This indicates that black households have a larger impact on the at-home meat market than their share of the population would indicate.

INTRODUCTION

This study is an empirical investigation of the economic structure of consumer demand for red meat, poultry, and fish. Estimates of demand structure are necessary to describe and explain economic consumption behavior for meats and meat products, provide relevant information about changes in demand structure, and forecast prices and quantities demanded. The results presented constitute part of the information needed to address these issues.

The study provides evidence relevant to describing and explaining consumer demand and consumption behavior for meat and meat products. Moreover, evidence is presented that the demand structure for meat is characterized by a high degree of stability. Empirical estimates of aggregate consumer demand responses to prices, income, socioeconomic, and demographic factors are derived from historic data which reflect demand behavior of consumers. A combination of contemporary methods, theoretical assumptions, and subjective judgements is used with these data to obtain the measured demand responses.

The study does not address the economics of production or supply--even though the quantity consumed in any given period of time is a direct consequence of the quantity supplied for that time period. But, the physical quantity consumed is not synonymous with the economic concept of demand, unless all prices, consumer income, and factors affecting tastes and preferences, are given. For this reason, this study does not provide forecasts of demanded quantities or prices.

Since it is not possible to provide a single definitive explanation of consumer meat demand, readers should pay particular attention to the assumptions underlying the results of this (or any other) demand study, and should be fully cognizant of the implications of these assumptions.

BACKGROUND

Per capita consumption of red meats, poultry, and fish, as a group, has increased from 172 pounds in 1950 to 230 pounds in 1980--a 33-percent increase.^{1/} During the same period the United States population increased from 150 million people to approximately 230 million people. These statistics provide the basis for an intuitive assessment of the tremendous growth in the meat production, processing, and marketing sectors which was required to sustain the increased levels of consumption.

The importance of the meat group to agricultural producers is well known. A large portion of the agricultural land in the United States is suitable only for the production of forage that can be used to produce beef animals and sheep. Together with hogs and poultry, these animals represent the principle method of marketing the nation's feed grain crop which is approximately 12 percent of cash receipts from the marketings of all farm products. Cash receipts from marketings of cattle, hogs, sheep and lambs, and poultry, account for approximately 35 percent of total cash receipts for all farm products.

In addition, these products are of primary importance to packers, processors, shippers, grocery stores, and the food service industry. In 1977, meat packers and processors had sales of approximately \$46 billion, and added approximately \$7.5 billion to the value of the animals they processed. In 1980, sales of red meat, poultry, and fish accounted for approximately 20 percent of total supermarket sales of about \$170 billion--a figure which includes a number of nonfood items.

Red meats, poultry, and fish are the most important foods in most consumer's diets. These products traditionally have accounted for over 40 percent of the protein in the diet and over 30 percent of consumers' food budgets. In addition, they are important sources of iron and other trace minerals necessary for maintaining good health.

In recent years various health associations, consumer groups, and government officials have expressed concern over the U.S. diet and its relation to health. Many groups have advised the U.S. consumer to cut back on red meat intake and increase poultry and fish consumption. In a recent USDA survey, 15 percent of consumers interviewed indicated that they had altered their consumption patterns to reflect this advice (4).^{2/} USDA per capita consumption data, when weighed against the survey results, do not yield a clear picture. Total red meat, poultry, and fish consumption increased by about 17 pounds per capita between 1973 and 1980 (table 1). In the same time period, beef consumption declined by about 4 pounds per capita, fish consumption declined slightly, poultry consumption increased by 11 pounds per capita, and pork consumption increased by about 10 pounds per capita. Per capita consumption of other red meats (veal, lamb and mutton,

^{1/} Retail weight equivalent.

^{2/} Underscored numbers in parentheses refer to literature cited at the end of the report.

processed meats) declined by approximately 1.5 pounds. Thus, the increase in pork consumption was more than enough to offset the decrease in the consumption of all other red meats.

Table 1--Per capita consumption of red meats, poultry, and fish 1/

Year	Beef	Veal	Pork	Lamb and mutton	Processed meats	Fish	Poultry	Total
<u>Pounds per capita</u>								
1973	80.5	1.5	57.1	2.4	9.8	12.8	48.9	213.0
1974	85.6	1.9	61.7	2.0	10.6	12.1	49.5	223.5
1975	87.9	3.4	50.6	1.8	10.2	12.2	48.6	214.7
1976	94.4	3.3	53.7	1.6	10.7	12.9	51.8	228.4
1977	91.8	3.2	55.8	1.5	10.6	12.7	53.2	228.8
1978	87.2	2.4	55.9	1.4	10.1	13.4	55.8	226.2
1979	78.1	1.7	63.8	1.3	9.7	13.0	60.5	228.1
1980	76.5	1.5	68.3	1.3	9.6	12.7	60.5	230.6

1/ Retail weight equivalent.

All of these changes took place during a period of increasing consumer expenditures and prices. From 1973 to 1980, U.S. per capita personal consumption expenditures increased by 91 percent--from approximately \$3,900 to \$7,400. Meat prices in general have increased at a lower proportional rate. Consumer prices for the various red meats, poultry, and fish are listed in table 2. Each price in this table was higher in 1980 than in 1973.

Comparing 1980 to 1973, fish prices increased 84 percent, veal prices increased 70 percent, and beef prices increased 68 percent. The smallest price increases were for pork (28 percent) and poultry (21 percent). Thus, while the price rose for each meat item in table 2, items with the smallest price increases were also the ones that had large increases in per capita consumption. This suggests that consumers have responded to changes in the relative prices of these meat items. Relative to beef prices, pork and poultry prices have declined since 1976 (table 3), and per capita consumption of these products increased over the same time period. Also, the price of fish was quite high relative to beef in 1977, and fish consumption declined in that year. Thus, there are numerous examples that indicate consumers respond to changes in relative prices. But, there are also a number of cases where they do not. In 1979, for

Table 2--Retail prices for Red meats, Poultry, and Fish

Year	Beef	Veal	Pork	Lamb and mutton	Processed meats	Fish	Poultry
<u>Cents per pound</u>							
1973	142	182	109	134	116	160	62
1974	146	194	108	146	115	175	59
1975	155	181	135	168	119	184	65
1976	148	173	134	186	119	194	62
1977	148	175	125	187	116	214	62
1978	182	209	144	220	143	233	69
1979	226	282	144	246	169	264	72
1980	238	309	140	253	172	295	75

Source: Fish prices are from U.S. Department of Commerce, Bureau of Marine Fisheries. All others are from U.S. Dept. Agr., Economic Research Service.

Table 3--Retail meat prices as a percentage of beef prices

Year	Veal	Pork	Lamb	Processed meats	Fish	Poultry
<u>Percent</u>						
1973	128	77	94	82	113	44
1974	133	74	100	79	120	40
1975	117	87	108	77	119	42
1976	117	91	126	80	131	42
1977	118	84	126	78	145	42
1978	115	80	121	79	128	38
1979	125	64	109	75	117	32
1980	130	59	106	72	124	32

example, fish prices declined relative to beef prices and fish consumption also declined. Thus, a problem with this approach is that we can select any price, or point in time as a basis for comparison. For instance, although fish prices declined relative to beef prices in 1979, they increased relative to poultry prices. The number of comparisons are seemingly endless. Moreover, the possible effect of other prices, consumer income, and factors that influence taste and preferences have not been taken into account.

Summarizing briefly, this examination of consumption and prices shows that the average U.S. consumer was eating more red meats and poultry in 1980 than in 1973. There is some evidence that the average consumer responds to traditional economic factors such as relative prices, and some evidence to the contrary. Still other evidence shows that some consumers say that they are eating less red meats, and more poultry and fish, due to health concerns. It is apparent that this partial approach does not take us very far toward providing definitive explanations of consumer demand behavior for meat. For example, we cannot answer any questions about how much meat consumers would like to remove from the market under a given price situation, or about the likely changes in quantities demanded when relative prices change. Even if this partial approach is augmented by statistical technique, these data do not yield information about the demand responses of consumers with different characteristics, and the observed contradictory response to relative prices is not necessarily removed. The effects of changes in this small set of traditional economic variables on meat consumption cannot be empirically separated from the effects of numerous other economic, socioeconomic, or demographic variables. Thus, our analytical approach must be altered if we are to provide more definitive explanations of consumer demand for meat.

Organization of the Report

The study begins with a brief discussion of the concepts we have used to analyze consumer meat demand. Following this is the main body of the study. The main body contains two broad parts on analysis of demand for meat and meat products: (1) aggregate demand responses and (2) at-home meat consumption, expenditures, and their relationship to socioeconomic and demographic characteristics of households.

The first part applies the economic demand framework to historical time series data for the United States to measure and describe how the average U.S. consumer responds to changes in income and prices. This part comprises a sequential disaggregation of demand--from food to individual meat items. Thus, one section focuses on the aggregate demand for food in relation to other goods and services. In other sections we present estimates of demand elasticities for the composite commodities of red meat, poultry, and fish; demand responses for a finer breakdown of meat items; and short run (monthly) price responses for individual meat items.

The second major part analyzes detailed data on at-home meat consumption from two USDA food consumption surveys. The primary focus is on the most recent 1977-78 survey, but a comparative analysis of the 1977-78 and 1965 surveys is also made.

DEMAND CONCEPTS

In order to analyze and interpret the multitude of data on behavior of meat consumers, a logically consistent and systematic framework is required. To provide this perspective we rely heavily on the traditional theory of individual consumer demand, and extend or modify this concept to encompass aggregate demand behavior and the behavior of households with different socioeconomic and demographic characteristics. Our approach is non-technical and somewhat different from the standard exposition. Therefore, we start with the following sketch to provide a common basis for understanding the observed data and its analysis.

Traditional Demand Theory

Consumers purchase a large number of food commodities, other than meat, in addition to numerous other goods and services. Generally, a consumer's decisions to purchase individual items are not made independently; they are made with reference to purchase decisions on other items. This is because of the restrictive budget circumstances each consumer faces. At any given point in time, the individual consumer is faced with a fixed amount of money to spend, and with specified prices of various goods and services. This forces the consumer to consider the amount of money available and the prices of all desired items when deciding upon the mix and amounts of each item contained in the total bundle of goods purchased. Thus, the consumer faces something of a balancing act in which there are many trade-offs. The consumer must not only decide on which specific commodities to consume, but also the quantity of each. In addition, the consumer must make decisions in such a way that the total sum of the price of each good times its quantity does not exceed the budget constraint. The implication of the budgeting process is that the quantity demanded of each good or service is determined by the price of that good, by the price of every other good or service, and the individual consumer's income. It is essential to keep this complete demand concept in mind since we have maintained this basis for the economic framework in subsequent analyses.^{3/}

Extensions to Traditional Demand Theory

Each consumer's individual characteristics influence that consumer's demand. Many of these characteristics have their effect through variables commonly termed tastes and preferences. The traditional theory of consumer demand takes these tastes and preferences as given and thus does not treat their impact explicitly. However, the measurement of the influence of these factors is important information for many program and policy, marketing, processing, and production issues. Since no observations on

^{3/} The terms income and total expenditure are used interchangeably in demand literature to represent the consumer's budget constraint.

these characteristics are contained in the time series data we use, we focus on the analysis of their impact in the part of the report which analyzes cross-section data on food consumption.

For the aggregate analyses concerned with total U.S. demand for red meat, poultry, and fish we assume that the U.S. population as a whole is a relatively homogeneous group and that individual consumption can be represented by total consumption divided by the U.S. population.

Response Measures

Since our goal is to provide information that can be used to answer questions about how much consumers would like to alter their consumption of meats in response to changes in prices and income, we must be able to link our data observations on consumption to those on prices and income. The elements which provide this link are called parameters, and we use appropriate statistical techniques to obtain estimates of these parameters.

Thus, parameter estimates are actual numbers derived from historical data reflecting realized consumption, price, and expenditure data. Common demand responses measured in this study are the demand responses attributable to a change in a good's own price (own-price response), the demand responses attributable to changes in the prices of other goods (cross-price responses), and demand responses attributable to a change in consumer expenditure or income (income responses).

Frequently the need arises to compare the price and income demand responses for different commodities. For instance, suppose that we wished to know if the demand for beef is more responsive to a change in the price of poultry than vice versa and, if so, how much more responsive is it? If we select a price change of 10 cents a pound, the comparison might be misleading since 10 cents is a much higher proportion of poultry prices than it is of beef prices. In order to free the responses from different units of measurement, we use the concept of demand elasticity for comparisons of this type. Simply put, the elasticity gives the percent change in quantity demanded for a small percentage change in some price, or income, when all other prices (and income) are held constant. In the present example the concept of elasticity allows us to say that a 1-percent increase in the price of beef indicates that the consumer would like to increase poultry consumption by X percent, when all other prices and income are assumed to remain at their present levels; whereas a 1-percent increase in the price of poultry indicates that the consumer would like to increase his beef consumption Y percent. This example makes use of the cross-price elasticity. The cross-price elasticity gives the percent change in quantity demanded of a particular good in response to a small percentage change in the price of some other good, with all other prices and income unchanged. Demand responses can also be described in terms of the own-price elasticity and the income elasticity.

AGGREGATE DEMAND RESPONSES

To obtain measures of demand responses, we use the demand framework and concepts discussed earlier; in conjunction with the properties, characteristics and limitations of the available data. Two important aspects of the demand concepts are that the total budget allocation and the implied interdependence among various budget items are reflected in the demand responses of consumers. Specifically, the implication is that the quantity demanded of each good or service is a function of the price of every good, service, or commodity, and the consumers total income. Thus, when we focus on the demand for any given item--food for example, we need to consider the possible effect of changes in income and the prices of all other items in addition to the price of food. To visualize this consider the following example.

Suppose we have three aggregate goods: (1) food, (2) durables, and (3) nondurables and services, whose respective prices are P_F , P_D , and P_N . If total expenditure is designated Y , we can represent the various responses, say elasticities (E), as follows:

Table 4--Demand elasticity matrix

Quantity	:	Prices			
	:	Food	Durables	Nondurables	Expenditure
	:	:	:	and services	:
	:	(P_F)	(P_D)	(P_N)	(Y)
	:	:	:	:	:
Food	:	E_{FF}	E_{FD}	E_{FN}	E_{FY}
Durables	:	E_{DF}	E_{DD}	E_{DN}	E_{DY}
Nondurables	:	E_{NF}	E_{ND}	E_{NN}	E_{NY}
and services	:				

In the first row of the matrix presented in table 4, E_{FF} is the own-price elasticity for food, showing the percentage change in the quantity of food demanded for a 1-percent change in the price of food. E_{FD} is the cross-price elasticity between the quantity of food and the price of durables, showing the percentage change in the quantity of food for a 1-percent change in the price of durable goods. Similarly, E_{FN} is the cross-price elasticity between the quantity of food and the price of nondurable goods and services. E_{FY} is the income elasticity for food, showing the percentage change in the quantity of food for a 1-percent change in income. Row 2 shows the analogous response of the quantity of durables for the three prices and income; and similarly, for nondurables and services in Row 3. Reading down the first column (P_F), E_{DF} is the cross-price elasticity showing the effect on the quantity of durables of a change in the price of food, and E_{NF} shows the food price effect on the quantity of

nondurables and services. This example displays all the potential effects of prices and income and therefore represents a complete demand system.

Given appropriate data, contemporary methods and procedures are available that can be used to obtain measurements of these various elasticity responses. In the following sections we present several examples of such sets of estimates based on available time series data.

Demand For Food At
Home, Food Away
From Home, and
Nonfood Items

We begin with a set of estimates in table 5 which shows the aggregate demand for food in relation to all other items. These estimates are based on personal consumption expenditures data for the United States for the period 1955 to 1981.

Table 5 contains all own-price, cross-price, and total expenditure (income) elasticity estimates for eleven aggregate commodities.^{4/} As in the example above, the category names listed down the left side of the table represent quantities; the headings across the top of the page represent the price of each item and the total expenditure on all budget items. The first number (-0.2073) indicates that consumers decrease their consumption of food eaten at home by 0.21 percent in response to a 1-percent increase in the price of food sold for home consumption (provided all other prices and total expenditure remain at their present levels).^{5/} Thus, the first number is the own-price elasticity for food at home. The second number in this row (-0.0119) indicates that consumers decrease their consumption of food at home by 0.01 percent in response to a 1-percent increase in the price of food consumed away from home; and the seventh number (-0.0226) indicates that consumers decrease their consumption of food at home by 0.02 percent in response to a 1-percent increase in the price of transportation (gasoline, oil, bus fares, etc.). Thus, the second and succeeding numbers in the first row are cross-price elasticities. The last number in the first row (0.3648) is an income elasticity--it indicates that consumers increase their consumption of food at home by 0.36 percent in response to a 1-percent increase in their budget.

Table 5 provides other relevant information about demand for food. By comparing the two cross-price elasticities explained above we can say that the demand for food at home is more than 1.5 times as responsive to a change in the price of transportation than it is to a change in the price of food away from home. By comparing the first (-0.0882) and seventh (-0.0471) numbers in the second row we can say that the demand for food away from home is almost two times more responsive to a change in the price of food at home than it is to a change in the price of transportation; and by comparing the first two numbers

^{4/} Refer to appendix note 1.

^{5/} This provision is termed the ceteris paribus assumption in demand literature. To avoid repetition, we will assume that these conditions are true in the remainder of the discussion on demand elasticities.

Table 5--Elasticity estimates: An example from a budget allocation study

Item	Food at home	Food away from home	Alcohol and tobacco	Clothing	Housing	Utilities	Transportation	Medical	Durable goods	Non-durable goods	Services	Expenditure
Food at home	-0.2073	-0.0119	-0.0113	-0.0169	-0.0261	-0.0125	-0.0226	-0.0165	-0.0217	-0.0116	-0.0257	0.3648
Food away from home	-0.0882	-0.3388	-0.0235	-0.0351	-0.0544	-0.0261	-0.0471	-0.0344	-0.0452	-0.0241	-0.0535	.7598
Alcohol and tobacco	-0.0649	-0.0182	-0.2191	-0.0258	-0.0400	-0.0192	-0.0347	-0.0254	-0.0332	-0.0177	-0.0394	.5592
Clothing	-0.1124	-0.0316	-0.0300	-0.4478	-0.0693	-0.0332	-0.0601	-0.0439	-0.0576	-0.0307	-0.0682	.9686
Housing	-0.1543	-0.0433	-0.0412	-0.0615	-0.6516	-0.0456	-0.0825	-0.0603	-0.0791	-0.0421	-0.0936	1.3297
Utilities	-0.0853	-0.0240	-0.0228	-0.0340	-0.0526	-0.3028	-0.0456	-0.0333	-0.0437	-0.0233	-0.0518	.7354
Transportation	-0.1215	-0.0341	-0.0324	-0.0484	-0.0749	-0.0359	-0.4717	-0.0475	-0.0622	-0.0332	-0.0737	1.0468
Medical	-0.1553	-0.0436	-0.0415	-0.0619	-0.0958	-0.0459	-0.0831	-0.6375	-0.0796	-0.0424	-0.0943	1.3387
Durable goods	-0.1624	-0.0456	-0.0433	-0.0647	-0.1001	-0.0480	-0.0868	-0.0634	-0.5413	-0.0443	-0.0985	1.3993
Nondurable goods	-0.1063	-0.0298	-0.0284	-0.0423	-0.0655	-0.0314	-0.0568	-0.0415	-0.0544	-0.3753	-0.0645	.9158
Services	-0.1136	-0.0319	-0.0303	-0.0452	-0.0700	-0.0336	-0.0607	-0.0444	-0.0582	-0.0310	-0.4753	.9788

in the expenditure column we can say that the demand for food away from home is about two times more responsive to a change in the budget than is the demand for food at home.

In order to provide some assessment of how well the demand structure describes the demand for food, a simulation of the complete demand system over the period 1955-81 was performed to provide estimates of the demand for food at home and food away from home.^{6/} These estimates were compared to the actual values by a summary statistic based on a commonly used squared-error criterion.^{7/} The error for the quantity demanded of food at home was about 2.6 percent and for the quantity demanded of food away from home about 3.4 percent. This evidence indicates that the estimated structure is a good description of the aggregate demand for food for this period. In addition, it emphasizes the economic significance of the set of price and income variables and underscores the inherent economic interdependence of all budget items.

The research results which appear throughout the remainder of this part of the report are based upon demand systems which consider the full budget allocation process. Since our focus is on the demand for meat we do not present all parameter estimates for the full systems, but the reader should keep in mind that the influence of (say) dairy product prices, vegetable prices, and nonfood prices are taken into account in the analyses.

U.S. Demand for Red Meat, Poultry, and Fish

In this section, we present a set of elasticity estimates for red meat, poultry, and fish. These estimates were obtained from a statistical analysis that treated nonfood as a single item in the consumer's budget and disaggregated the food sector into several general commodity groups.^{8/} Quantity variables are annual USDA per capita consumption data and price variables are corresponding BLS price indices. The estimates were obtained from data for the period 1950-77.

The own-price, cross-price, and income elasticities in table 6 are for the composite commodities of red meat, poultry, fish, and nonfood. The numbers in this table are grouped in pairs.

^{6/} That is, the observed values for each price and expenditure variable are used with the estimated response measures to develop an estimated quantity for each year.

^{7/} The statistic has a range between zero and infinity. It takes the value of zero when estimated quantities are identical to corresponding actual quantities. For ease of interpretation the values of the statistic have been converted to percentages. A small percentage indicates close agreement between estimated and actual quantities. Refer to appendix note 2 for an explanation of the squared error statistic.

^{8/} These were red meat, poultry, fish, eggs, dairy products, fats and oils, fresh fruits, fresh vegetables, processed fruits and vegetables, cereals, sugar and sweeteners, and nonalcoholic beverages.

The upper number in each pair is an elasticity estimate; the lower number is the standard error of the elasticity estimate.^{9/}

To interpret the individual entries in table 6, view the commodity stubs down the left side of the table as representing the quantity demanded of each commodity, and the captions across the top as the corresponding commodity price (except for the last column which represents total expenditure). The first entry in the upper left corner (-0.6768) is the estimate of the own-price elasticity of demand for red meat. This estimate indicates that the average U.S. consumer decreases consumption of red meat by about 0.7 percent in response to a 1-percent increase in the price of red meat, *ceteris paribus*. The second elasticity to the right (0.0984) is the cross-price elasticity between the quantity of red meat demanded and the price of poultry. This cross-price elasticity shows that with a 1-percent increase in the price of poultry, *ceteris paribus*, consumers increase the quantity of red meat by about 0.1 percent. The remaining cross-price elasticities in the first row are interpreted in a similar way. The last estimate in the first row (0.6507) is the income elasticity of demand for red meat. This elasticity indicates that consumers increase their consumption of red meat by about 0.7 percent in response to a 1-percent increase in total expenditure on all goods and services, *ceteris paribus*.

Turning to the first column of table 6, the second estimate (0.5649) is the cross-price elasticity between the quantity of poultry and the price of red meat. Thus, consumers increase their consumption of poultry by about 0.6 percent in response to a 1-percent increase in the price of red meat, *ceteris paribus*. The remaining elasticity estimates in this column can be similarly interpreted--they represent the average consumer's response to a 1-percent change in the price of red meats. Thus, a 1-percent increase in the price of red meat causes the average consumer to decrease the quantity red meat demanded by about 0.7 percent; increase the quantity of poultry demanded by about 0.6 percent; increase the quantity of fish demanded by about 0.16 percent; and decrease the quantity of nonfood demanded by only about 0.02 percent.

The last column of table 6 shows the estimated income elasticities for red meat (0.6507), poultry (0.7470), fish (0.5492) and nonfood (1.2064). From a statistical viewpoint these elasticities appear to be good time series estimates. From an economic standpoint the signs and the size of coefficients relative to one another appear reasonable, but we are much less able to assess whether this is the case for the absolute magnitudes. The relative economic importance of nonfood in the budget allocation process, as indicated by its relatively large coefficients, is worth noting.

^{9/} The ratio of the elasticity estimate to its standard error gives a measure of reliability of the estimate. The larger the absolute value of the ratio, the more confident we are that we have a reliable estimate.

Similar to the procedure used for the demand system represented in table 5, the complete demand system represented by table 6 was simulated for the 1950-77 period to assess how well it described the historic demand structure. This resulted in error statistics, in percentage terms, of 2.72, 3.97, 4.05 and 3.16, respectively, for red meat, poultry, fish, and nonfood. These results suggest that the estimated complete demand system, part of which is contained in table 6, provides a good description of the U.S.

Table 6--Red meat, poultry, and fish: Elasticity estimates from a composite demand system 1/

Item	: Red meat	: Poultry	: Fish	: Other food items	: Nonfood	: Expenditure
Red meat	: -.6768 : (.0300)	: 0.0984 : (.0094)	: 0.0117 : (.0052)	--	: 0.1033 : (.0957)	: 0.6507 : (.1012)
Poultry	: .5649 : (.0505)	: -.8860 : (.0406)	: .0522 : (.0184)	--	: -.3560 : (.1754)	: .7470 : (.1594)
Fish	: .1590 : (.0657)	: .1199 : (.0421)	: -.0531 : (.0426)	--	: .0833 : (.2544)	: .5492 : (.2289)
Other food items	: --	: --	: --	--	: --	: --
Nonfood	: -.0235 : (.0027)	: -.0088 : (.0011)	: -.0023 : (.0007)	--	: -1.0263 : (.0120)	: 1.2064 : (.0106)

-- Indicates that elasticities for these items were estimated as part of the system but are not included in the table.

1/ This table contains partial results of the composite food demand system. For more detail on the system, see appendix note 3. The figures in parentheses are the estimated standard errors of the associated elasticity estimates.

meat demand structure for the period covered. It also demonstrates the major role that economic variables play in the explanation of demand behavior for meat and meat products and the economic significance of the interrelatedness of demand for such commodities. In addition, this evidence has other important implications. By inference, it appears that these price and income relationships on the demand for meat are characterized by a good deal of stability.

Demand for Beef
and Veal, Pork,
Other Red Meat,
Chicken, Turkey,
Fresh and Frozen
Fish, Canned and
Cured Fish

In order to obtain more specific information on the demand relationships for individual meat items in a total budget context, the composite commodities of table 6 were disaggregated into a system containing 42 food commodities and nonfood. Red meat as separated into the product categories of beef and veal, pork, and other red meat; poultry was divided into the commodity categories of chicken and turkey; and fish was disaggregated into the two categories of fresh and frozen, and canned and cured. The own-price, cross-price, and income elasticity estimates for these categories and nonfood are extracted from the total system and presented in table 7. The data used are annual observations for the period 1953-77.^{10/} Quantity variables are based on USDA per capita disappearance data and price variables are the corresponding BLS price indices.

Table 7 can be read in a similar fashion to table 6. The own-price elasticities are: beef and veal, -0.6565; pork, -0.7302; other red meat, -0.6898; chicken, -0.5804; turkey, -0.6485; etc. The magnitude of the own-price elasticity for pork relative to beef and veal appears to be somewhat high when compared to other estimates and experience, which usually show a slightly larger relative magnitude for beef and veal. Similar comments apply to the magnitude of the elasticity for pork relative to chicken and turkey. Nevertheless, except for fresh and frozen fish, the relatively small standard errors of these own-price elasticities suggest that they warrant a degree of confidence. The cross-price elasticities also indicate a degree of interdependence among the set of commodities that is non-negligible.

Although there is no theoretical reason for concern, some of the income elasticities of table 7 should be interpreted and/or used with caution. The relatively large standard errors for some of the income elasticities (chicken for example) indicate that those elasticities could vary over a wide range. The size of the standard error of the income elasticity estimate for turkey suggests that the estimate, with its negative sign, should be disregarded. The magnitude of the income elasticity for pork appears high relative to the income elasticity for beef. Generally, the estimated cross-price elasticities between turkey and other meat commodities do not appear to be as large as those between beef, pork, and chicken; and, statistically they do not appear to be as precise. Possible reasons are that the use of annual observations for poultry commodities may be too aggregative in the time dimension for the purpose at hand; and, the price data for turkey in the early years of this period has some deficiencies.^{11/} In addition, from a more general viewpoint, one might expect that both the absolute and relative magnitudes of the estimates of own-price and income elasticities of table 7 should satisfy certain relationships to the corresponding

^{10/} The period used began in 1953 comparable price data were not available for some commodities in prior years. For more detail on data used see appendix note 3.

^{11/} BLS price data on ready-to-cook turkey were not available for early years and the series was completed using other sources.

composite estimates of table 6. But, while the disaggregated data correspond to the same groups comprising the composite commodities of table 6, the number of variables has increased by more than three times, the data entering the statistical estimation are therefore different, and the statistical estimation procedure is not exactly the same. All of these factors have potential effects on the particular statistical results obtained.

Although one should be cognizant of these possible aberrations of statistical estimation, they should not overshadow the economic relevance and significance of the results. The results of table 7 provide ample evidence of responsiveness of quantities demanded to prices and income, and of significant interdependence among the various meat and related commodities that can hardly be ignored. Specifically, the cross-price elasticities between the trio of beef and veal, pork, and chicken, indicate that there is a large degree of substitutability between these products.

Similar to the previous simulation and evaluation for the demand systems underlying the results in tables 5 and 6, the complete 43 commodity system was simulated for the period 1953-77 and a summary statistic measuring the discrepancy between simulated and actual quantities consumed was computed. The commodities and respective percentage errors are: beef and veal (2.12), pork (3.16), other red meat (3.04), chicken (2.53), turkey (3.68), fresh and frozen fish (3.09), and canned and cured fish (4.14). The computed error between simulated and actual quantities demanded, ranging from about two to four percent, suggests that the estimated complete demand structure, from which table 7 is extracted, is a good description of the historic demand structure for the various meat commodities and that the price and income relationships were rather stable over the period covered. Furthermore, it tends to support the contention that the various statistical discrepancies are of relatively minor importance in the context of this study.

Monthly Price Responses

Implicit in the previous estimates of demand relationships for various meats and meat products is the assumption that prices and income are given and that consumers adjust quantities purchased until they exhaust their income. This is consistent with the traditional demand model of individual consumer behavior. Given a period of time of sufficient length in which such adjustment can take place it is reasonable to assume that this conceptual framework properly characterizes aggregate consumer behavior. However, for the very short run, it is reasonable to assume that quantities and income are given and that adjustments must take place in market prices.

In this context, we have recast the disaggregated meat demand system, treating prices as functions of quantities consumed and consumer income. To the extent possible, we have maintained the concept of a total budget allocation model. However, concurrent considerations of data requirements and data exiguity caused us to slightly modify the model.

Table 7--Elasticity estimates, Disaggregated demand model 1/

Item	Beef and veal	Pork	Other red meat	Chicken	Turkey	Fresh and frozen fish	Canned and cured fish	Other goods	Expend- iture
Beef and veal	-0.6565 (0.0723)	0.1171 (0.0280)	0.0140 (0.0250)	0.0409 (0.0279)	-0.0056 (0.0138)	-0.0026 (0.0152)	0.0361 (0.0135)	--	0.2341 (0.1308)
Pork	0.1613 (0.0403)	-0.7302 (0.0316)	0.0353 (0.0214)	0.1014 (0.0214)	0.0202 (0.0103)	0.0213 (0.0117)	0.0331 (0.0098)	--	0.4756 (0.1401)
Other red meat	0.0712 (0.1377)	0.1373 (0.0820)	-0.6898 (0.2134)	-0.0494 (0.0748)	0.0202 (0.0623)	0.0538 (0.0905)	-0.0989 (0.0732)	--	0.4442 (0.2157)
Chicken	0.1613 (0.1053)	0.2796 (0.0559)	-0.0327 (0.0517)	-0.5804 (0.0774)	0.0148 (0.0355)	-0.0271 (0.0341)	-0.0829 (0.0313)	--	0.1755 (0.2201)
Turkey	-0.0650 (0.2064)	0.2320 (0.1072)	0.0597 (0.1696)	0.0626 (0.1402)	-0.6485 (0.1397)	0.1222 (0.1084)	0.0271 (0.0959)	--	-0.3601 (0.3798)
Fresh and frozen fish	-0.0447 (0.2059)	0.2036 (0.1109)	0.1333 (0.2246)	-0.0998 (0.1227)	0.1098 (0.0987)	-0.1662 (0.1649)	0.0623 (0.1135)	--	0.4991 (0.3595)
Canned and cured fish	0.4968 (0.1854)	0.3197 (0.0941)	-0.2498 (0.1839)	-0.3040 (0.1138)	0.0230 (0.0884)	0.0630 (0.1149)	-0.2994 (0.1266)	--	0.5926 (0.3323)
Other goods	--	--	--	--	--	--	--	--	--

-- Indicates that these elasticities were estimated in the demand system from which this table is drawn.

1/ This table contains partial results of the disaggregated demand system. The figures in parentheses are the estimated standard errors of the associated elasticity estimates.

concept of a total budget allocation model. However, concurrent considerations of data requirements and data exiguousness caused us to slightly modify the model.

To estimate the set of price relationships, monthly per capita quantities demanded for 7 meat items and 14 prices for the period January 1964 to December 1979 were used.^{12/} The correspondence between the prices and quantity variables, while less than ideal, is as close as can be achieved with available data. The model used expresses each price as a function of the 7 quantities, an "all other quantities" commodity variable, income, and a set of seasonal (monthly) variables.^{13/}

Since the price relationships express price as a function of quantities consumed, following tradition, the response coefficients are called flexibilities.^{14/} They cannot be interpreted as estimates of the reciprocals of the price elasticities. The estimated flexibilities are presented in table 8. The upper part of the table shows the flexibilities for price categories beef and veal, pork, other meat, and broilers. The lower part of the table shows the flexibilities for individual meat components of the beef, pork, and other meat categories.

Table 8 differs from the preceding tables of complete demand system results in that the quantity variables are listed across the top and the price variables down the left side. The tabled values can be read directly as price flexibilities with the corresponding standard error in parentheses below the flexibility estimate. Thus, the own-price flexibility between the price of beef and veal and the quantity of beef is -0.3685, indicating that a marginal 1-percent increase in market quantity of beef would require a beef and veal price decrease of about 0.4 percent, given that all other quantities demanded remain unchanged. For pork the own-price flexibility is -0.6001 and can be similarly interpreted.

It is apparent that all estimates of the own price flexibilities are less than one in absolute value. This occurrence is not new, for it was encountered and discussed by others (1, 17). But it does contradict expectations based on conventional wisdom, which holds that own price flexibilities for demand-inelastic commodities are greater than one in absolute value. However, this conventional view is based on the definition of the price flexibility as the reciprocal of the corresponding elasticity, a situation appropriate to the unique circumstance of a single demand relation in which quantity is solely a function of its own price. In general, this concept is not appropriate for a demand function in which quantity is a function of all prices and income, or for a complete system of such demand equations. In the present context of a meat subsystem, there is no a priori

^{12/} For more detail on the data and sources see appendix note 4.

^{13/} See appendix note 4 for further explanation of the model.

^{14/} The price flexibility is a measure of the percentage change in price attributable to a small percentage change in the quantity of one item, with all other quantities and income held constant.

Table 8--Estimated monthly price flexibilities ^{1/}

Item	Beef	Veal	Pork	Lamb and Mutton	Broilers	Turkey	Other Chicken	Non-Food	Income	^{2/} Seasonal Variables
Beef & Veal	-0.3685 (0.0712)	-0.0174 (0.0113)	0.0084 (0.0507)	-0.0029 (0.0106)	0.1501 (0.0692)	0.0048 (0.0173)	0.0467 (0.0236)	--	1.0	--
Pork	0.1777 (0.0881)	0.0001 (0.0141)	-0.6001 (0.0634)	-0.0120 (0.0136)	0.2481 (0.0856)	0.0239 (0.0224)	0.0317 (0.0296)	--	1.0	--
Broilers	-0.1001 (0.1334)	0.0075 (0.0219)	-0.3627 (0.0937)	-0.0017 (0.0203)	-0.4094 (0.1318)	0.0330 (0.0325)	0.0954 (0.0443)	--	1.0	--
Other meats	-0.0856 (0.0519)	-0.0065 (0.0080)	-0.0891 (0.0373)	-0.0063 (0.0074)	0.1154 (0.0489)	-0.0001 (0.0122)	-0.0098 (0.0165)	--	1.0	--
Beef:										
Sirloin steak	-0.3419 (0.0667)	-0.0063 (0.0101)	-0.0041 (0.0486)	-0.0040 (0.0098)	0.1547 (0.0636)	-0.0057 (0.0166)	0.0453 (0.0217)	--	1.0	--
Round steak	-0.3769 (0.0724)	-0.0077 (0.0114)	-0.0265 (0.0517)	0.0007 (0.0106)	0.1431 (0.0699)	0.0123 (0.0174)	0.0644 (0.0237)	--	1.0	--
Round roast	-0.3320 (0.0673)	-0.0122 (0.0106)	-0.0348 (0.0481)	0.0013 (0.0099)	0.1397 (0.0646)	0.0094 (0.0161)	0.0623 (0.0219)	--	1.0	--
Chuck roast	-0.5080 (0.0936)	-0.0115 (0.0148)	-0.0298 (0.0670)	-0.0089 (0.0141)	0.2102 (0.0910)	0.0032 (0.0231)	0.0747 (0.0311)	--	1.0	--
Ground	-0.4183 (0.0881)	-0.0397 (0.0142)	0.0728 (0.0626)	-0.0004 (0.0135)	0.1675 (0.0869)	0.0135 (0.0218)	0.0311 (0.0298)	--	1.0	--
Pork:										
Pork chops	0.1013 (0.0824)	-0.0110 (0.0138)	-0.5813 (0.0587)	-0.0154 (0.0137)	0.2856 (0.0842)	0.0463 (0.0220)	0.0597 (0.0297)	--	1.0	--
Canned ham	0.1151 (0.0632)	-0.0001 (0.0089)	-0.2070 (0.0472)	-0.0068 (0.0083)	0.0964 (0.0561)	0.0108 (0.0146)	-0.0208 (0.0187)	--	1.0	--
Bacon	0.3748 (0.1145)	0.0084 (0.0180)	-0.8452 (0.0835)	-0.0100 (0.0177)	0.2470 (0.1099)	0.0325 (0.0298)	0.0442 (0.0382)	--	1.0	--
Sausage	0.1004 (0.0919)	0.0021 (0.0141)	-0.4571 (0.0669)	-0.0098 (0.0135)	0.2194 (0.0867)	0.0087 (0.0226)	0.0046 (0.0296)	--	1.0	--
Frankfurters	-0.2043 (0.0774)	-0.0158 (0.0123)	-0.1176 (0.0553)	-0.0033 (0.0116)	0.1831 (0.0752)	0.0008 (0.0190)	-0.0042 (0.0257)	--	1.0	--

-- Indicates that these flexibilities were estimated in the demand system from which this table is drawn.

^{1/} This table contains partial results of the short-run demand analysis for meats; the figures in parentheses are the estimated standard errors.

^{2/} All income flexibilities are constrained to unitary values on the basis of demand theory. For additional detail see appendix note 4.

reason for expecting these flexibilities to be greater than one (absolute value) nor does the fact that they are less than unity imply corresponding own price elasticities which are greater than one (absolute value).

The first row of the table shows the cross-price flexibilities for beef and veal associated with the various demanded quantities. Consider the cross-price flexibility for broilers, which is 0.1501. This indicates that a marginal 1-percent increase in the quantity of broilers requires a 0.15-percent increase in the price of beef and veal if consumers are to purchase the additional quantity of broilers, when all other quantities and income remain unchanged. The interpretation of the cross-price flexibilities in a given column have a slightly different interpretation, since all prices vary for the given quantity change. Taking the first column (beef) as an example, a marginal one percent increase in the quantity of beef, with all other quantities unchanged, would require percentage changes in the prices of beef (-0.3685), pork (0.1777), chicken (-0.1001), and other meats (-0.0856).

With one exception (pork chops), the cross-price flexibility estimates for the quantity of lamb and mutton are smaller than their estimated standard errors. From a statistical viewpoint this means that the estimated flexibilities are not precise. Thus, we are not able to accurately assess the effects of marginal increases in the monthly quantity of lamb and mutton on the monthly prices of the other meat items. A similar situation occurs for the estimated cross-flexibilities in the columns for veal and turkey, with the same implications. Other price flexibility estimates, whose magnitudes are either relatively small, or less than, their respective standard errors, should be similarly interpreted.

As with the previous demand systems, the complete set of price equations underlying the results of table 8 were simulated over the period 1964-79. The estimated prices obtained from this simulation were compared with the actual prices using the same statistic as for the earlier demand systems. The error statistic values for each price equation are shown in table 9.

Table 9--Error Statistics for the monthly demand system

Beef and veal	0.98	Pork chops	1.23
Pork	1.24	Canned ham	.80
Broilers	1.31	Bacon	1.62
Other meats	.68	Chuck roast	1.30
Sirloin steak	.90	Ground beef	1.23
Round steak	.98	Sausage	1.27
Round roast	.90	Frankfurters	1.03

Obviously the range of error is quite low, being less than 2 percent in all cases. The small error is pleasantly surprising since monthly data usually have much greater inherent variation than quarterly or annual data and are usually harder to explain. These results provide substantial support for concluding that the set of estimated equations is a good description of the short run demand relationships, and that these relationships were stable over the 1964-79 period.

Summary of Aggregate Demand Responses

To measure the effects of changes in prices and consumer incomes on meat demand we used an empirical approach which takes into account the consumers total budget allocation process. Several sets of response parameter estimates are presented, starting first with elasticities for a complete demand system of very aggregative commodities, and proceeding with elasticities reflecting successive disaggregations of meat and meat products. In the final section, we briefly consider an alternative approach to traditional demand analysis for short run demand relationships and summarize short run consumer responses in the form of price flexibility estimates.

The relative effects of income changes were found to be uniformly greater on nonfood items than on food at home, food away from home, composite meat items, and individual meats. In general, nonfood items are characterized by income elasticities which are near one, or greater than one, in magnitude. Aggregate food items, and all meat items, have income elasticity estimates which are less than one. The implication of the income elasticity estimates is that continued increases in consumer incomes, with all prices remaining constant, will be reflected in smaller proportions of consumer incomes allocated to food and meat items, and larger proportions allocated to nonfood items. Declining consumer incomes will have the opposite effect.

Own-price elasticity estimates, with the exception of those for some fish items, appear to be precise in a statistical sense. Although we pointed out some possible discrepancies between the relative magnitudes of several own-price elasticity estimates and those found by others, it is important to remember that all statistical analyses can provide only elasticity *estimates*--true values remain unknown. Given the relatively small standard errors for the red meat and poultry items, we are confident in stating that consumers will decrease consumption of these items by about 0.7 percent in response to a 1 percent price increase for a particular item. Thus, own-price responses appear to be similar in magnitude for composite commodities of red meat and poultry; and also for the disaggregate commodities of beef and veal, pork, other red meat, chicken, and turkey.

The cross-price elasticity estimates indicate that there is a non-negligible substitution effect among commodities for a change in any one price. One characteristic of the cross-price elasticity estimates was that, as we proceeded with a sequential disaggregation of meats and meat products, the statistical

precision of the estimates for minor budget items became lower. A more positive finding was that the interaction between major budget items became clearer. In particular, we found that there is a strong interaction between beef, pork, and poultry items and that this interaction is not symmetric. For instance, the impact of an isolated 1-percent change in the price of red meat on the quantity of poultry demanded is more than five times the impact, in percentage terms, of an isolated 1-percent change in the price of poultry on the quantity of red meat demanded.

Simulation results for each of the three traditional demand models provide support for the conclusion that these systems provide good descriptions of the consumer demand structure for the time periods covered by the respective analyses and that this structure is characterized by a high degree of stability. None of the error statistics for individual demand relations exceeded 5 percent. Thus, an overwhelming part of the variation in quantity demanded of each item studied can be explained by just two types of economic factors--consumer prices and incomes. This is, perhaps, the most important finding of this part of the study since it supports the contention that there have not been major changes in consumer tastes and preferences.

The price flexibilities of the monthly demand model demonstrate economic interdependence among prices for composite and disaggregate meat items in the short run. The evidence presented in this analysis is complementary to the evidence obtained from the three more traditional demand models. Beef, pork, and broilers exhibited rather strong short term interdependence among prices for a change in any given quantity, minor budget items exhibited less, and the short-run effects on prices were not symmetric. Simulation results for the short run system also confirmed the stability of the demand structure for the period covered.

AT-HOME MEAT
CONSUMPTION,
EXPENDITURES,
AND THEIR
RELATIONSHIP TO
SOCIOECONOMIC AND
DEMOGRAPHIC
CHARACTERISTICS OF
HOUSEHOLDS

In the previous part, aggregate U.S. time series data on quantities, prices, and income were used to measure the average U.S. consumer's meat demand responses to changes in prices and income. Because these data are national aggregates taken at certain intervals, the estimated elasticities reveal information about changes in those aggregates from one interval to the next. In conjunction with U.S. population data, they can provide information on changes in aggregate per capita meat consumption in response to annual average changes in prices and per capita income.

This part of the study examines the at-home meat demand responses of households with different income levels, socioeconomic, and demographic characteristics. In particular, the relationship between at-home meat demand and income, household size, race, region, and urbanization is examined. To provide information on some of the more salient effects of these factors we make use of two USDA cross-section food consumption surveys. Lack of the same type of data on away from home food consumption prevents extension of the analysis to away from home meat demand.

We begin by presenting tabulations of per capita meat consumption data from the 1977-78 Nationwide Food Consumption Survey (NFCS) and briefly examine the data relative to income, season of the year, household size, race, region, and urbanization. Subsequently, in order to isolate and measure the net effects of these factors on the at-home consumption of individual meat items, the NFCS data are analyzed using regression techniques. In the final sections tabular and regression comparisons are made between per capita meat consumption data from the spring quarter of the 1977-78 NFCS and the spring quarter of a similar 1965 survey. Each of these sections is followed by a summary of major findings.

The 1977-78
Nationwide Food
Consumption
Survey

The 1977-78 NFCS is the most recent of six national household food consumption surveys conducted by the USDA. The survey sample is representative of households in the 48 conterminous States and contains detailed information on household socioeconomic and demographic characteristics and the types and amounts of foods used. The survey has two parts: (1) a 1-week recall of the kinds, quantities, values, and sources of foods used from home supplies ^{15/}; and (2) an individual intake record which details

^{15/} Home supplies include food and beverages used at home during the 7 days before the date of the survey interview, whether bought or received without direct expenditure. Included were food and beverages eaten at home, carried from home in packaged meals, thrown away, and fed to pets. Excluded from food at home were commercial pet foods, household food fed to animals raised for commercial purposes, food given away for use outside the home, and food consumed in commercial establishments or in homes of others. Meats purchased as a single ingredient item at restaurants and brought home for consumption are included in the analysis. Meat purchased at restaurants along with other food items and brought into the home are classified as mixtures in the survey data and are excluded from this analysis.

for each household member the kinds and quantities of foods consumed, both at home and away from home. The household portion of the survey provides the basis for the analysis presented in this section. Thus, the quantities and values reported relate to foods used from home supplies during a 7-day period.

The cross-section survey data are collected over a 1-year period beginning in spring (April 1977) and ending in the following winter (March 1978). Thus, four quarters of data are available for analysis from the 1977-78 NFCS.^{16/} The large sample size and great diversity of household characteristics contained in this survey permits the measurement of the relationship of these characteristics to at-home expenditure and consumption behavior.

In the survey, information on household characteristics and food use was obtained through personal interviews with the household member most responsible for food purchases and preparation. The households were contacted at least 1 week prior to the interview and asked to keep unstructured notes on food use and expenditures to assist them during the interview. In addition, trained interviewers used a detailed food item list to assist the respondents in recalling information on the kinds, quantities, value, and sources of food used from home supplies during the 7 days immediately preceding the interview. Nonpurchased foods such as those produced at home or received through donations, programs for the elderly, gifts, or pay are included with purchased foods and valued at the average prices reported in the survey for the same item, region, and season. Foods consumed away from home such as at restaurants, schools, and cafeterias are not included in these data. ^{17/}

At-home meat consumption in the 1977-78 NFCS is measured both in terms of quantity (physical weight) and money value (expenditure) of the food used. The quantity measure is closely related to the physical satisfaction in demand (18, p. 220) and it can be used to answer questions related to nutrition and the volume of goods passing through marketing channels. The money value measure is relevant as a measure of consumer satisfaction or well-being in the sense that the prices consumers pay reflect the unit value of the goods. The total money value of the goods consumed is the price (value) weighted sum of the quantities used. For example, the money value measure of consumption considers a consumer who purchases a pound of chicken for \$1 and a pound of beef for \$2 as obtaining twice the satisfaction from the pound of beef compared to the pound of chicken.

^{16/} The sample was chosen using a multistage, stratified probability sampling procedure. Sampling weights are used in the tabular analysis to improve the representation of the sample. For a more complete description of the 1977-78 NFCS sample see (6).

^{17/} Only housekeeping households are included in the analyses. A housekeeping household is defined as one in which at least one household member eats 10 or more meals from home supplies during the survey period. Survey evidence suggests that approximately 93 percent of all households are housekeeping households.

Money value measures also reflect variation in characteristics of the product group, including quality and variety, as well as marketing and consumer services provided with the product. Product variation and quality are inherent in the grouping of meat items into a manageable number of classifications for analysis. Thus, it is beneficial to conduct analyses on both quantity and value measures of consumption and compare the results. Subsequently, by combining the results it is possible to isolate a quantity and quality component of demand for the various meat items.

Item prices vary for many reasons. One reason is the heterogeneity of items within a food group. For example, even with narrowly defined products such as rib and loin steaks there is product quality variation associated with the grade of beef, subprimal cut, trimming, deboning, and so on. In addition, price variation is associated with bulk packaging, convenience, and consumer services which are purchased with the product. Price variation associated with the above mentioned components are all considered as various aspects of product quality in this analysis.^{18/}

The 1977-78 NFCS contains data for a large number of households with quite diverse characteristics. Even for a small segment of the survey such as the meat sector, the NFCS contains thousands of observations on consumption and money values of a detailed set of meats and meat products, income, and many socioeconomic and demographic variables which relate to each household in the survey. Because these detailed data are contained on computer tapes, they are not widely accessible. Given this, it is difficult to develop an overview or perspective for the broad outlines and leading characteristics of the sampled population as regards meat consumption. In the following section, we describe the meat consumption data in tabular form classified by income, season, household size, race, region, and urbanization.

Description of the 1977-78 NFCS

Average after-tax household income for different regions, races, income quintiles, household sizes, and urbanization of household residence is presented in table 10. ^{19/} The income data do not reflect the value of in-kind benefits received from social programs such as the food stamp program or the school lunch program. They do reflect cash transfers from other social programs.

These data indicate that households in the West had the highest average income and also the smallest household size. Black households had average incomes considerably less than nonblacks and

^{18/} Price variation associated with inflation is not considered as quality variation but it is included in the quality component as measured in this analysis.

^{19/} The 1977-NFCS survey was divided into five equal size groups (quintiles) according to the level of reported household money income. Those with the lowest incomes are in the first quintile and those with the highest are in the fifth quintile. Households which did not report their income were excluded from the analysis.

Table 10--Mean after-tax income and household size by various categories, 1977-78

Category	Income	Household size
	Dollars	Number
All households	11,562	3.05
Income Quintile:		
I -- lowest	3,379	2.05
II	6,990	2.77
III	10,444	3.25
IV	14,489	3.54
V -- highest	23,807	3.63
Household size:		
1 member	5,784	1.00
2 members	11,118	2.00
3 members	12,567	3.00
4 members	14,202	4.00
5 members	14,847	5.00
6 or more members	14,768	6.80
Race:		
Black	7,642	3.31
Nonblack	12,111	3.01
Region:		
Northeast	12,207	3.07
Northcentral	12,231	3.15
South	9,936	3.00
West	12,373	2.95
Urbanization:		
Central city	10,140	2.86
Suburban	13,474	3.20
Nonmetropolitan	10,817	3.05

the average black household was larger than the average nonblack household. The higher income quintiles were associated with larger household sizes and households in suburban locations had higher incomes and larger families than households in other urbanizations.

Income

Tables 11 and 12 show that lower income households had higher at-home per person meat consumption levels but lower money value of meat used than higher income households. This is due to the consumption of more expensive meats such as loin and rib steaks, by households in the higher income quintiles.

Households in the lower income quintiles consumed more pork, poultry, fish, and miscellaneous meats per person than higher income households. But in terms of per person money value of these meats used, the discrepancy narrows considerably.

Season

In tables 13 and 14 weekly per capita at-home consumption and expenditure figures for different seasons of the year are presented. Quantities consumed of red meat, and fish and shellfish were highest in the spring quarter and lowest in the winter quarter. On the other hand, per capita weekly value of red meats used was highest in the winter quarter.

Poultry consumption and the money value of poultry used was highest in the fall quarter. This observation reflects the large consumption of turkey during the holiday season.

Household Size

In tabulations based on household size, tables 15 and 16 show that smaller size households consume and spend more per person on meats at home than larger size households. It should be remembered that the figures in these tables are unadjusted for any other variables such as income, race, and so on. Thus, if economies of size in meat purchasing were taken into account, the differences in the tables would be smaller. Also, larger households typically include young children who consume less. Thus, the per capita consumption and expenditure figures of these households are lower than those for smaller households.

Race

In order to examine differences in at-home meat consumption related to race, the sample households were separated into black and nonblack subsamples. Blacks consumed about 35 percent more meat per person from home supplies than nonblacks but the money value of meat used was only about 16 percent higher (table 17). The per person quantity of beef consumed was the same for both groups but blacks consumed 40 percent more pork, 56 percent more poultry, and 108 percent more fish than nonblacks. In terms of the money value of meats used at home, these differentials narrow.

Region

Tables 18 and 19 present a regional breakdown of at-home meat consumption and money value of meat used. The data reveal that households in the South consumed more pork and fish than households

Table 11--Weekly home meat consumption, By income quintile,
1977-78

Item	Income Quintile				
	I	II	III	IV	V
	Pounds per capita				
Total meats	4.65	4.37	4.21	4.14	4.21
Red meats	2.55	2.58	2.57	2.59	2.64
Beef	1.55	1.61	1.65	1.71	1.77
Loin and rib					
Steaks	.16	.21	.24	.29	.38
Roasts	.02	.01	.02	.03	.04
Round and chuck					
Steaks	.25	.27	.26	.28	.24
Roasts	.34	.37	.39	.39	.41
Ground	.62	.62	.63	.62	.60
Other	.15	.13	.10	.11	.10
Pork	.94	.92	.85	.83	.79
Fresh ^{1/}	.36	.39	.34	.34	.29
Processed ^{1/}	.21	.21	.22	.22	.24
Bacon and sausage	.37	.32	.30	.27	.26
Veal	.03	.03	.03	.02	.04
Lamb, mutton, goat	.03	.03	.03	.02	.04
Poultry	1.10	.93	.84	.81	.85
Chicken	.99	.82	.73	.65	.68
Whole	.73	.60	.50	.45	.41
Parts	.23	.19	.20	.17	.22
Processed	.03	.03	.03	.03	.04
Turkey	.10	.10	.11	.15	.16
Whole	.05	.06	.07	.11	.11
Parts	.06	.04	.04	.04	.05
Other	.01	.01	.00	.01	.01
Fish and shellfish	.39	.35	.33	.30	.35
Fish	.36	.31	.28	.25	.27
Shellfish	.04	.04	.05	.05	.08
Miscellaneous	.62	.51	.48	.44	.36
Franks	.17	.15	.15	.14	.12
Luncheon meats	.27	.24	.26	.25	.20
Variety meats	.18	.12	.07	.05	.04

^{1/} Excluding bacon and sausage

Table 12--Money value of weekly home meat consumption, By income quintile, 1977-78

Item	Income Quintile				
	I (lowest)	II	III	IV	V (highest)
	Dollars per capita				
Total meats	5.05	4.95	4.93	5.08	5.51
Red meats	3.12	3.21	3.27	3.42	3.70
Beef	1.79	1.91	2.00	2.16	2.38
Loin and rib					
Steaks	.27	.36	.41	.52	.69
Roasts	.03	.02	.04	.04	.06
Round and chuck					
Steaks	.34	.36	.35	.36	.34
Roasts	.39	.43	.48	.49	.53
Ground	.60	.59	.60	.61	.62
Other	.17	.16	.13	.14	.14
Pork	1.23	1.22	1.15	1.17	1.17
Fresh 1/	.48	.50	.44	.46	.41
Processed 1/	.29	.31	.33	.36	.41
Bacon and sausage	.46	.40	.38	.35	.34
Veal	.05	.04	.06	.05	.09
Lamb, mutton, goat	.04	.04	.06	.04	.07
Poultry	.76	.65	.61	.62	.69
Chicken	.66	.56	.52	.49	.53
Whole	.43	.36	.31	.28	.26
Parts	.19	.16	.17	.16	.21
Processed	.04	.04	.04	.05	.06
Turkey	.09	.08	.09	.12	.15
Whole	.03	.04	.05	.07	.08
Parts	.05	.04	.04	.05	.07
Other	2/	.01	2/	.01	.01
Fish and shellfish	.52	.51	.47	.47	.61
Fish	.45	.44	.38	.37	.45
Shellfish	.08	.07	.09	.10	.16
Miscellaneous	.65	.57	.58	.58	.51
Franks	.17	.15	.16	.16	.14
Luncheon meats	.35	.33	.37	.37	.33
Variety meats	.13	.09	.05	.05	.04

1/ Excluding bacon and sausage

2/ Less than .005

Table 13--Weekly home meat consumption, By season, 1977-78

Item	Average	Spring	Summer	Fall	Winter
Pounds per capita					
Total meats	4.32	4.39	4.32	4.36	4.23
Red meats	2.61	2.70	2.61	2.57	2.59
Beef	1.69	1.73	1.71	1.65	1.66
Loin and rib					
Steaks	.27	.31	.28	.24	.27
Roasts	.02	.02	.03	.02	.02
Round and chuck					
Steaks	.26	.28	.28	.25	.24
Roasts	.39	.39	.39	.41	.38
Ground	.62	.62	.64	.60	.61
Other	.12	.11	.10	.13	.13
Pork	.86	.90	.84	.86	.86
Fresh ^{1/}	.34	.34	.33	.35	.34
Processed ^{1/}	.22	.26	.21	.20	.22
Bacon and sausage	.30	.29	.30	.31	.31
Veal	.03	.03	.03	.03	.04
Lamb, mutton, goat	.03	.04	.03	.03	.03
Poultry	.90	.85	.85	1.01	.89
Chicken	.77	.76	.77	.76	.77
Whole	.54	.52	.54	.55	.54
Parts	.20	.21	.20	.19	.20
Processed	.03	.04	.03	.03	.03
Turkey	.13	.09	.08	.24	.11
Whole	.08	.04	.04	.19	.07
Parts	.04	.04	.04	.05	.04
Other	.01	.01	^{2/}	.01	.01
Fish and shellfish	.34	.37	.36	.33	.29
Fish	.29	.33	.31	.26	.25
Shellfish	.05	.04	.05	.07	.04
Miscellaneous	.48	.47	.50	.46	.48
Franks	.15	.15	.17	.13	.14
Luncheon meats	.24	.24	.25	.23	.23
Variety meats	.09	.08	.08	.10	.09

^{1/} Excluding bacon and sausage^{2/} Less than .005

Table 14--Money value of weekly home meat consumption, By season, 1977-78

Item	Average	Spring	Summer	Fall	Winter
Dollars per capita					
Total meats	5.15	5.15	5.12	5.10	5.24
Red meats	3.40	3.41	3.36	3.32	3.51
Beef	2.10	2.11	2.10	2.03	2.14
Loin and rib					
Steaks	.48	.53	.49	.42	.49
Roasts	.04	.03	.04	.04	.04
Round and chuck					
Steaks	.35	.35	.37	.34	.34
Roasts	.48	.47	.46	.49	.49
Ground	.61	.60	.62	.58	.62
Other	.14	.13	.12	.15	.17
Pork	1.19	1.19	1.16	.18	1.24
Fresh ^{1/}	.46	.44	.44	.47	.48
Processed ^{1/}	.35	.38	.33	.32	.35
Bacon and sausage	.39	.36	.38	.40	.40
Veal	.06	.06	.05	.06	.08
Lamb, mutton, goat	.05	.06	.05	.05	.05
Poultry	.67	.64	.63	.73	.66
Chicken	.55	.56	.55	.53	.56
Whole	.33	.32	.33	.33	.33
Parts	.18	.19	.18	.16	.18
Processed	.04	.05	.04	.04	.04
Turkey	.11	.08	.07	.18	.10
Whole	.06	.03	.03	.13	.05
Parts	.05	.05	.05	.05	.05
Other	.01	.01	.01	.01	.01
Fish and shellfish	.52	.54	.53	.50	.50
Fish	.41	.44	.43	.38	.40
Shellfish	.11	.10	.10	.12	.10
Miscellaneous	.57	.56	.62	.54	.57
Franks	.16	.16	.18	.14	.16
Luncheon meats	.34	.33	.36	.33	.34
Variety meats	.07	.07	.06	.07	.07

^{1/} Excluding bacon and sausage

Table 15--Weekly home meat consumption, By household size, 1977-78

Item	Household size					
	1	2	3	4	5	6 or more
	member	members	members	members	members	members
	Pounds per capita					
Total meats	4.31	4.02	4.53	4.00	3.91	3.83
Red meats	2.94	3.09	2.77	2.44	2.35	2.30
Beef	1.85	1.99	1.80	1.59	1.51	1.47
Loin and rib						
Steaks	.30	.37	.31	.26	.23	.18
Roasts	.02	.03	.03	.03	.02	.01
Round and chuck						
Steaks	.27	.29	.29	.25	.24	.24
Roasts	.42	.52	.40	.35	.34	.34
Ground	.67	.64	.65	.60	.59	.61
Other	.16	.14	.12	.11	.10	.09
Pork	.98	1.00	.91	.79	.79	.79
Fresh ^{1/}	.34	.36	.35	.32	.35	.34
Processed ^{1/}	.25	.28	.25	.20	.19	.18
Bacon and sausage	.38	.36	.32	.27	.26	.27
Veal	.05	.05	.03	.03	.03	.02
Lamb, mutton, goat	.06	.05	.02	.03	.02	.02
Poultry	1.34	1.05	.95	.80	.81	.76
Chicken	1.21	.90	.78	.69	.68	.65
Whole	.78	.62	.55	.47	.48	.49
Parts	.37	.24	.20	.19	.18	.13
Processed	.06	.03	.03	.03	.03	.03
Turkey	.12	.14	.15	.11	.13	.11
Whole	.05	.09	.10	.08	.09	.09
Parts	.07	.06	.05	.04	.04	.03
Other	.01	.01	.01	^{2/}	^{2/}	^{2/}
Fish and shellfish	.49	.43	.36	.30	.28	.27
Fish	.44	.36	.29	.26	.24	.24
Shellfish	.06	.07	.06	.05	.04	.02
Miscellaneous	.55	.45	.46	.45	.46	.50
Franks	.14	.12	.14	.15	.15	.16
Luncheon meats	.25	.23	.24	.23	.24	.25
Variety meats	.16	.10	.08	.07	.07	.09

^{1/} Excluding bacon and sausage^{2/} Less than .005

Table 16--Money value of weekly home meat consumption, By household size, 1977-78

Item	Household size					
	1	2	3	4	5	6 or more
	member	members	members	members	members	members
	Dollars per capita					
Total meats	6.51	6.22	5.50	4.80	4.54	4.23
Red meats	4.05	4.14	3.67	3.20	2.97	2.76
Beef	2.44	2.57	2.28	1.98	1.82	1.67
Loin and rib						
Steaks	.61	.67	.55	.46	.38	.29
Roasts	.04	.05	.04	.04	.03	.02
Round and chuck						
Steaks	.38	.39	.39	.34	.33	.30
Roasts	.53	.64	.51	.43	.40	.38
Ground	.69	.65	.64	.58	.56	.57
Other	.19	.18	.15	.14	.12	.11
Pork	1.41	1.40	1.29	1.11	1.06	1.02
Fresh ^{1/}	.49	.49	.48	.44	.45	.43
Processed ^{1/}	.41	.43	.39	.33	.29	.26
Bacon and sausage	.50	.48	.42	.35	.32	.33
Veal	.09	.09	.06	.06	.05	.04
Lamb, mutton, goat	.12	.09	.04	.05	.03	.03
Poultry	1.02	.80	.71	.59	.59	.53
Chicken	.90	.66	.57	.50	.48	.44
Whole	.48	.38	.35	.29	.28	.29
Parts	.33	.22	.18	.17	.16	.11
Processed	.09	.05	.05	.04	.04	.04
Turkey	.11	.13	.12	.09	.11	.09
Whole	.03	.06	.07	.05	.06	.06
Parts	.08	.07	.06	.04	.05	.03
Other	.01	.01	.01	.00	.00	.00
Fish and shellfish	.80	.71	.55	.44	.42	.38
Fish	.65	.55	.42	.36	.33	.33
Shellfish	.14	.16	.13	.08	.09	.05
Miscellaneous	.64	.58	.57	.55	.56	.56
Franks	.16	.14	.16	.16	.16	.17
Luncheon meats	.36	.35	.35	.34	.34	.33
Variety meats	.12	.09	.06	.05	.06	.06

^{1/} Excluding bacon and sausage

^{2/} Less than .005

Table 17--Weekly home meat consumption, Quantities and money value, By race, 1977-78

Item	Quantities		Money value	
	Black	Nonblack	Black	Nonblack
	Pounds per capita		Dollars per capita	
Total meats	5.61	4.14	5.88	5.05
Red meats	2.89	2.58	3.53	3.38
Beef	1.67	1.67	1.95	2.12
Loin and rib				
Steaks	.23	.28	.37	.50
Roasts	.02	.03	.02	.04
Round and chuck				
Steaks	.28	.26	.36	.35
Roasts	.39	.39	.46	.48
Ground	.56	.63	.54	.62
Other	.19	.11	.21	.14
Pork	1.15	.82	1.47	1.15
Fresh ^{1/}	.50	.32	.64	.43
Processed ^{1/}	.22	.22	.29	.36
Bacon and sausage	.43	.28	.54	.37
Veal	.04	.03	.06	.06
Lamb, mutton, goat	.03	.03	.05	.05
Poultry	1.31	.84	.86	.64
Chicken	1.16	.71	.76	.52
Whole	.89	.48	.53	.30
Parts	.25	.19	.19	.18
Processed	.03	.03	.04	.05
Turkey	.15	.12	.10	.11
Whole	.08	.09	.06	.06
Parts	.07	.04	.04	.05
Other	<u>2/</u>	.01	<u>2/</u>	.01
Fish and shellfish	.57	.31	.68	.50
Fish	.52	.25	.58	.39
Shellfish	.05	.05	.10	.11
Miscellaneous	.83	.42	.82	.54
Franks	.21	.14	.21	.15
Luncheon meats	.30	.23	.39	.34
Variety meats	.32	.05	.22	.05

^{1/} Excluding bacon and sausage

^{2/} Less than .005

Table 18--Weekly home meat consumption, By region, 1977-78

Item	Region			
	North east	North central	South	West
	Pounds per capita			
Total meat	4.45	4.27	4.54	3.86
Red meats	2.62	2.70	2.66	2.41
Beef	1.67	1.77	1.63	1.67
Loin and rib				
Steaks	.30	.26	.26	.28
Roasts	.03	.02	.02	.03
Round and chuck				
Steaks	.30	.24	.24	.27
Roasts	.36	.45	.40	.34
Ground	.56	.69	.60	.62
Other	.12	.11	.11	.12
Pork	.82	.89	.99	.67
Fresh <u>1/</u>	.37	.37	.34	.26
Processed <u>1/</u>	.23	.23	.24	.16
Bacon and sausage	.22	.29	.41	.25
Veal	.07	.02	.02	.02
Lamb, mutton, goat	.06	.01	.01	.05
Poultry	1.03	.78	.97	.77
Chicken	.87	.65	.86	.63
Whole	.51	.48	.67	.44
Parts	.33	.13	.17	.16
Processed	.03	.03	.03	.04
Turkey	.15	.13	.11	.14
Whole	.09	.09	.07	.09
Parts	.05	.04	.04	.04
Other	.01	.01	<u>2/</u>	.01
Fish and shellfish	.36	.26	.42	.30
Fish	.30	.23	.34	.26
Shellfish	.06	.02	.08	.04
Miscellaneous	.43	.54	.49	.37
Franks	.15	.16	.14	.12
Luncheon meats	.21	.29	.23	.19
Variety meats	.07	.08	.12	.06

1/ Excluding bacon and sausage2/ Less than .005

Table 19--Money value of weekly home meat consumption, By region,
1977-78

Item	Region			
	North east	North central	South	West
	Dollars per capita			
Total meats	5.90	4.83	5.03	4.82
Red meats	3.81	3.25	3.33	3.18
Beef	2.33	2.00	2.00	2.09
Loin and rib				
Steaks	.57	.41	.45	.51
Roasts	.05	.02	.03	.04
Round and chuck				
Steaks	.43	.29	.33	.37
Roasts	.49	.50	.48	.42
Ground	.61	.64	.58	.59
Other	.18	.13	.13	.15
Pork	1.23	1.20	1.28	.97
Fresh ¹ / ₁	.52	.46	.44	.38
Processed ¹ / ₁	.40	.36	.34	.27
Bacon and sausage	.30	.38	.50	.33
Veal	.14	.03	.04	.04
Lamb, mutton, goat	.11	.02	.02	.08
Poultry	.85	.55	.64	.63
Chicken	.70	.44	.55	.51
Whole	.34	.28	.37	.30
Parts	.31	.11	.14	.16
Processed	.05	.05	.03	.05
Turkey	.14	.10	.08	.11
Whole	.06	.06	.05	.06
Parts	.07	.04	.04	.05
Other	.01	.01	.01	.01
Fish and shellfish	.64	.39	.53	.54
Fish	.51	.33	.40	.44
Shellfish	.13	.06	.13	.10
Miscellaneous	.60	.65	.54	.46
Franks	.18	.17	.15	.13
Luncheon meats	.35	.42	.30	.28
Variety meats	.07	.06	.09	.05

¹/₁ Excluding bacon and sausage

in the other regions. But households in the Northeast had the largest per capita money value of meat consumed. The data in these tables reveal substantial differences across regions for both per capita at-home consumption and money value of meat used. These differences then can be partially attributed to income differences shown in table 10, proximity to production areas, and regional prices.

Urbanization

Table 20 shows that residents of central cities consumed a larger quantity of total meat at home than their suburban or nonmetropolitan counterparts, while table 21 indicates that they also spent more on total meat per person. Nonmetropolitan residents consumed about 12.8 percent less and spent about 14 percent less on red meats than did central city residents. It should also be noted that the largest percentage of home-produced red meats was in the nonmetropolitan area (see appendix table 2).

Quantities consumed and expenditures for pork at home were largest for residents of central cities, with approximately 42 percent of expenditures on pork allocated to fresh products. Residents of nonmetropolitan regions allocated about 34 percent of their pork budgets to fresh pork and 37 percent to bacon and sausage.

Poultry consumption was largest in the central city—about 20 percent higher than suburban residents and about 31 percent higher than nonmetropolitan residents.

Within the poultry group, residents of central cities consumed over 90 percent more chicken parts than did nonmetropolitan residents. This probably reflects two factors. First, home production is considerably larger in nonmetropolitan regions, hence, store purchases are smaller. Secondly, households in central cities or suburban areas are more likely to have two wage earners, thus consumption of cut-up chicken reflects a convenience or quality factor in at-home preparations.

Central city residents consumed about 32 percent more fish and shellfish than residents of the other urbanizations. They also spend about 30-45 percent more per person on fish and shellfish than their counterparts in other urbanizations.

Statistical Analysis of the 1977-78 NFCS

The previous description of the survey data, categorized by various socioeconomic and demographic factors, shows the apparent influence of these factors on meat consumption. However, it does not provide information on the net effect of the various factors nor the magnitude of their individual influence.

Regression analysis of the survey data allows measurement of these effects and provides additional information for understanding the demand for meats and related products. Specifically, net effects of the various factors listed above are obtained, and their statistical significance assessed. In the case of the

Table 20--Weekly home meat consumption, By urbanization, 1977-78

Item	Central city	Suburban	Nonmetropolitan
	<u>Pounds per capita</u>		
Total meats	4.76	4.14	4.15
Red meats	2.71	2.56	2.59
Beef	1.72	1.68	1.68
Loin and rib			
Steaks	.28	.29	.25
Roasts	.03	.03	.02
Round and chuck			
Steaks	.29	.25	.25
Roasts	.38	.39	.40
Ground	.59	.61	.65
Other	.14	.11	.11
Pork	.91	.82	.88
Fresh <u>1/</u>	.39	.33	.32
Processed <u>1/</u>	.21	.23	.22
Bacon and sausage	.30	.26	.35
Veal	.05	.04	.02
Lamb, mutton, goat	.04	.03	.02
Poultry	1.06	.85	.81
Chicken	.94	.69	.70
Whole	.66	.44	.54
Parts	.25	.22	.13
Processed	.03	.03	.03
Turkey	.12	.15	.11
Whole	.07	.11	.07
Parts and offals	.05	.05	.03
Other	.01	.01	<u>2/</u>
Fish and shellfish	.41	.31	.30
Fish	.35	.26	.26
Shellfish	.06	.05	.04
Miscellaneous	.57	.41	.45
Franks	.16	.13	.15
Luncheon meats	.26	.22	.23
Variety meats	.15	.06	.07

1/ Excluding bacon and sausage2/ Less than .005

Table 21--Money value of weekly home meat consumption, By urbanization,
1977-78

Item	:	:	:
	: Central city	: Suburban	: Nonmetropolitan
	:	:	:
	:	<u>Dollars per capita</u>	
	:	:	:
Total meats	: 5.70	5.15	4.68
Red meats	: 3.61	3.45	3.16
Beef	: 2.18	2.17	1.95
Loin and rib	:		
Steaks	: .50	.54	.40
Roasts	: .04	.05	.02
Round and chuck	:		
Steaks	: .39	.34	.33
Roasts	: .47	.50	.46
Ground	: .60	.61	.61
Other	: .18	.14	.12
Pork	: 1.27	1.16	1.16
Fresh 1/	: .53	.45	.40
Processed 1/	: .34	.37	.32
Bacon and sausage	: .40	.34	.43
Veal	: .09	.07	.03
Lamb, mutton, goat	: .08	.05	.03
Poultry	: .78	.67	.56
Chicken	: .68	.53	.47
Whole	: .41	.27	.32
Parts	: .22	.21	.11
Processed	: .05	.05	.04
Turkey	: .10	.13	.09
Whole	: .05	.07	.05
Parts	: .05	.06	.04
Other	: .01	.01	<u>2/</u>
Fish and shellfish	: .64	.50	.44
Fish	: .51	.40	.35
Shellfish	: .13	.10	.09
Miscellaneous	: .66	.54	.52
Franks	: .17	.15	.15
Luncheon meats	: .38	.34	.32
Variety meats	: .11	.05	.05

1/ Excluding bacon and sausage

2/ Less than .005

income variable, elasticity measures are obtained that provide additional information and detail to enhance the information obtained from the time series analyses.

The traditional theory of consumer demand used in the first part of the report, with extensions to include socioeconomic factors, demographic factors, and differences in product quality, provides the framework for the present analysis of NFCS data. Consequently, demand relationships comprising a solution to the consumers budget allocation problem can be expressed either as a set of quantity-income equations or as a set of expenditure-income equations and a restriction equating the sum of expenditures to income. Thus, both the quantity and expenditure for each good are viewed as functions of consumer income, prices of all goods, and socioeconomic and demographic variables that influence tastes and preferences. Each of these relationships provide somewhat different but complementary information about the demand for meat.

Theoretically, in a cross-section survey all consumers are assumed to face the same relative prices for commodities at a given point in time. Thus, explicit observations on prices are not usually obtained. In fact, cross-section data are usually collected over a short time interval, and the combined observations on quantities and expenditure are compared to provide implicit information on prices. These implicit prices vary systematically with factors such as season, region, and urbanization. The effects of these factors can be taken into account in the regression analysis. Additional implied price variation is assumed to result from differences in product variety and quality. Consequently, the quantity and expenditure equations are used in conjunction with theoretical relationships to derive a measure of quality variation (5).

Using the above framework and the 1977-78 NFCS data, regression equations were estimated for 32 different meat categories. The detailed regression equations are discussed in appendix note 4 and accompanying statistical results are contained in appendix table 2. In the following we summarize and discuss the major results of this analysis. The presentation starts with the results related to income and proceeds in turn, with the effects of season, household size and age structure, urbanizational and regional location of the household, and race. The numerical results are summarized in tables. These tables are constructed to show the isolated effect of the particular factor considered--other factors in the regression equation are held constant at the sample means. Should the effect for different values of the explanatory variables be of interest they can be obtained via the equations of appendix table 3 and the summary information presented in table 10.

Consumer responses to income changes are summarized in table 22 in the form of elasticities. Three different elasticities are presented. They are the money value elasticity, the quantity elasticity, and the quality elasticity. The reported elasticities

show the average percentage change in per person meat consumption from home supplies given a 1-percent increase in per person disposable income.

The money value or the expenditure elasticity measures the percentage change in the money value of consumption for a specific meat item given a 1-percent change in income. For example, an expenditure elasticity of 0.5 indicates that a 1-percent increase in income is associated with a 0.5-percent increase in the money value of the commodity consumed. The quantity elasticity measures the percentage change in the quantity consumed given a 1-percent change in income. This elasticity is referred to as the income elasticity in earlier parts of this report. In this part, we use the term quantity elasticity to provide a clear distinction between this elasticity and the expenditure elasticity. On the assumption that price variation is directly related to quality variation, the quality elasticity measures the extent to which the average item price paid varies with consumer income. Based on underlying theoretical relationships, the quality elasticity is computed as the difference between the estimated expenditure and quantity elasticities.

The expenditure elasticity estimate for total meat (red meats, poultry, fish and shellfish, and variety meats) consumed from home supplies is 0.12. This indicates that a 1-percent increase in income is associated with a 0.12-percent increase in the money value of meat consumed. The estimated quantity elasticity for at-home consumption of total meat is 0.0. This implies that the total quantity of meat consumed at home is not responsive to income changes. Thus, the quantity of meat consumed from household supplies changes very little, if any, as income rises. The quality elasticity (0.12) means that higher income consumers tend to purchase higher quality-higher priced meats.

Expenditure and quantity elasticities vary widely across meat groups and subgroups while the quality elasticities vary less. The largest expenditure elasticities are found for the higher priced meats. These include lamb, mutton, and goat (0.79), loin and rib steaks (0.65), shellfish (0.68), other poultry (0.46), and loin and rib roasts (0.53). The smallest expenditure elasticities are found for the lower priced meats. These items include round and chuck steaks (-0.06), variety meats (-0.16), whole chickens (-0.16), franks (-0.17), and whole turkeys (-0.19).

Red meat has the largest money value and quantity elasticities of the major meat groups. The estimated money value elasticity for the red meat group is 0.14. The quantity elasticity for red meat is 0.04. There is substantial variation in the money value elasticities for the red meat subgroups: lamb, mutton, and goat is 0.79; veal is 0.54; beef is 0.18; and, pork is 0.02. The quantity elasticities range from a high of 0.62 for lamb, mutton, and goat; to a low of -0.06 for pork. Falling in between this range: the beef quantity elasticity is 0.07; and veal is 0.41.

Table 22. Consumer at-home meat responses to changes in income

Item	: Expenditure : elasticity	: Quantity : elasticity	: Quality <u>1/</u> : elasticity
Total meats	: 0.12	0.00	0.12
Red meats	: .14	.04	.10
Beef	: .18	.07	.11
Loin and rib	: .65	.55	.10
Steaks	: .53	.43	.10
Roasts	: -.06	-.07	.01
Chuck and round	: .20	.12	.08
Steaks	: -.04	-.09	.05
Roasts	: .00	-.13	.13
Ground	: .02	-.06	.08
Other Beef	: -.12	-.16	.04
Pork	: .28	.14	.14
Fresh <u>2/</u>	: -.06	-.11	.05
Processed <u>2/</u>	: .54	.41	.13
Bacon and sausage	: .79	.62	.17
Veal	: .06	-.04	.10
Lamb, mutton, goat	: .04	-.05	.09
Poultry	: -.16	-.20	.04
Chicken	: .27	.23	.04
Whole	: .59	.52	.07
Parts	: .12	-.01	.13
Processed	: -.19	-.19	.00
Turkey	: .44	.31	.13
Whole	: .46	.23	.23
Parts	: .26	.12	.14
Other	: .14	.03	.11
Fish and Shellfish	: .68	.55	.13
Fish	: -.17	-.21	.04
Shellfish	: -.08	-.16	.08
Franks	: -.16	-.32	.16
Luncheon meats			
Variety meats			

1/ Calculated as the difference between the expenditure elasticity and the quantity elasticity.

2/ Excluding bacon and sausage.

The quality elasticity for red meat is 0.10. This indicates that for each 1-percent increase in income, consumers pay about 0.1-percent more per pound for red meats, presumably in the form of higher quality cuts with more trimming, deboning, and packaging.

There is considerable variation in the quantity and money value elasticities within the beef product group. Loin and rib cuts, which are generally higher priced than the other cuts, have the largest money value and quantity elasticities. The money value elasticities for primal cuts of loin steaks and roasts are 0.65 and 0.53, respectively. Corresponding quantity elasticities are 0.53 and 0.43. Steaks from the round and chuck primal cuts, ground beef, and other beef have the lowest expenditure and quantity elasticities within the beef group. The estimated quantity elasticity for round and chuck steak is -0.06. The quantity elasticities for ground beef and other beef are -0.09 and -0.13, respectively. The money value elasticities for round and chuck steak, ground, and other beef are -0.06, -0.04, and 0.0, respectively.

At-home pork consumption is not as responsive to income changes as beef. In fact, the analysis shows that the quantity of pork consumed at home decreases as income increases. The money value elasticity for all pork is estimated to be 0.02 and the quantity elasticity is estimated to be -0.06. These elasticities imply that a 1-percent increase in income is associated with an increase the money value of pork consumption by 0.02 percent but a decrease in the quantity of pork consumption of 0.06 percent. In combination, these elasticities imply a quality elasticity of 0.08. Thus, consumers decrease their at-home pork consumption as income rises, but they substitute more expensive cuts for less expensive ones. The money value and quantity consumed of fresh pork, and bacon and sausage, are also negatively related to income while other processed pork is found to be positively related to income. Consequently, as income rises, the consumption of processed pork will increase and the consumption of fresh pork, and bacon and sausage will decrease.

Money value and expenditure elasticities also differ widely across the various poultry products. In general, the more highly processed higher priced products have larger income responses. The money value elasticity for the poultry group is 0.06 and the quantity elasticity is -0.04. This indicates that a 1-percent rise in income will result in a 0.04-percent decline in the quantity of poultry consumed but a 0.06-percent increase in the money value of poultry consumed at home. Fewer whole chickens and turkeys are purchased as incomes rises. The average money value elasticity for chicken (0.04) can be thought of as a weighted average of the money value elasticities for whole chickens (-0.16), parts (0.27), and processed chicken (0.59)--which are all quite different. Whole turkeys have a money value elasticity of -0.19 which is opposite in sign from the corresponding elasticity for turkey parts of (0.44). Other poultry, which includes many gourmet items such as cornish game hens, duck, and other poultry delicacies, is

much more responsive to changes in income than other poultry items. The money value elasticity for this subgroup is 0.46 and the quantity elasticity is 0.23. Franks, luncheon meats, and variety meats have negative money value and quantity elasticities. The money value elasticities are -0.17, -0.08, and -0.16, respectively. The quantity elasticities are -0.21, -0.16, and -0.32, respectively.

Seasonality

The regression analyses reveal substantial seasonal variation in at-home consumption of several meat items. However, the seasonal variations among the meat items tend to be offsetting and hence total meat consumption is not significantly influenced by season. The results of statistical tests for seasonal variation in meat consumption are reported in table 23. Estimates of the seasonal variation relative to the spring quarter are reported in table 24.

Seasonal variation in consumption is closely associated with weather conditions, holidays, and the cyclical nature of production. The measured seasonal factors for meat reflect these characteristics. For example, meats such as ground beef, steaks, and chicken which require short cooking time and are frequently cooked on an outdoor grill are consumed more heavily during the spring and summer quarters. Conversely, meats such as whole turkeys, beef and pork roasts which are oven baked are more heavily consumed in the fall and winter. It should be noted that some of the per capita consumption and money values for specific meat items in table 24 are quite small. Where these are associated with large percentage changes by season, they should be interpreted with caution.

Household Size and Age Structure

Household size and age composition influences the kinds and types of meat products consumed from home supplies. While it is not possible with the NFCS household data to measure consumption by particular individuals, it is possible to measure the average effect of the number and ages of individuals on total household consumption. These effects include consumption by the particular individual and that individual's effect on the consumption pattern of other household members. For example, a household with pre-school aged children usually eat more meals from home supplies than households comprised of young adults. Differences in consumption patterns by these households include food choice, serving size, and the number of meals eaten. Relative effects of household members by age group are summarized in table 25. Statistical tests of significance are reported in table 23. In table 25, an individual in the 20-39 year age group is assumed to be the standard consumer--individuals in other age groups are measured relative to this base. The weekly consumption of a particular family is estimated by adding together the consumer-equivalents for the age groups corresponding to each household member and multiplying this sum by the average consumption for the base group. For example, households composed of two adults and a child with ages 37, 35, and 14, respectively, would have an average weekly at-home meat

Table 24--Seasonal Variation in per capita household at-home meat consumption

Item	Quantity				Money Value			
	Spring	Summer	Fall	Winter	Spring	Summer	Fall	Winter
	Percent Difference				Percent Difference			
Total meats	4.61	1	0	- 1	5.47	2	- 1	3
Red meats	2.80	- 1	- 5	- 2	3.61	0	- 2	3
Beef	1.78	2	- 3	- 2	2.22	2	- 2	3
Loin and rib								
Steaks	.31	- 3	-18	-13	.56	- 3	-15	- 9
Roasts	.03	5	22	-17	.04	3	38	- 5
Round and chuck								
Steaks	.27	14	- 6	- 2	.35	15	1	7
Roasts	.42	- 6	2	- 5	.51	- 5	4	2
Ground	.62	7	0	3	.62	7	- 1	6
Other	.12	- 4	7	21	.15	- 2	9	29
Pork	.95	- 8	- 8	- 3	.27	- 3	- 4	4
Fresh ^{1/}	.33	0	2	5	.43	4	7	15
Processed ^{1/}	.30	- 2	-33	-19	.43	-18	-24	-11
Bacon and sausage	.32	1	4	3	.40	5	7	8
Veal	.04	-10	- 3	10	.06	-13	12	15
Lamb, mutton, goat	.04	1	- 3	-24	.06	- 1	- 9	-23
Poultry	.90	6	21	12	.69	3	15	9
Chicken	.81	9	5	7	.60	6	- 2	2
Whole	.52	14	13	18	.32	13	9	18
Parts	.24	23	- 9	-12	.22	0	-11	-12
Processed	.04	6	-18	-24	.06	- 7	-25	-26
Turkey	.09	-26	165	59	.08	-19	125	48
Whole	.04	-45	360	127	.03	-39	376	134
Parts	.05	-12	14	6	.06	- 9	10	9
Other	.01	-32	100	48	.01	-20	235	123
Fish and shellfish	.41	0	-14	-21	.60	4	- 7	- 4
Fish	.36	- 4	-24	-25	.49	1	-15	- 8
Shellfish	.05	27	54	7	.11	19	26	13
Franks	.15	9	-15	- 8	.15	11	-10	- 3
Luncheon meats	.24	10	1	- 1	.34	12	2	6
Variety meats	.10	-15	- 2	- 1	.08	- 6	3	2

^{1/} Excluding bacon and sausage.

Table 25--Net effects of household composition on per capita at-home meat consumption

Item	: Standard 1/ : : Consumer	Age Group					
		: 0-2	: 3-12	: 13-19	: 20-39	: 40-64	: 65 and Over
	: Pounds	-----Standard Consumer Equivalent-----					
Total meats	: 4.49	0.54	0.81	0.95	1.00	1.23	1.01
Red meats	: 2.75	.44	.74	.90	1.00	1.22	.99
Beef	: 1.79	.47	.73	.93	1.00	1.20	.93
Loin and rib	:						
Steaks	: .31	.54	.68	.81	1.00	1.16	.71
Roasts	: .02	.04	.11	.88	1.00	1.76	1.78
Round and chuck	:						
Steaks	: .29	.52	.73	1.04	1.00	1.13	.76
Roasts	: .34	.27	.66	.81	1.00	1.80	1.47
Ground	: .72	.51	.80	1.02	1.00	.91	.75
Other	: .12	.58	.71	.85	1.00	1.45	1.35
Pork	: .90	.38	.73	.84	1.00	1.22	1.02
Fresh 2/	: .35	.42	.89	.81	1.00	1.19	.78
Processed 2/	: .23	.37	.61	.74	1.00	1.24	1.24
Bacon and sausage	: .32	.34	.65	.94	1.00	1.23	1.11
Veal	: .03	.02	.73	.83	1.00	1.66	2.27
Lamb, mutton, goat	: .02	.52	1.51	.97	1.00	1.69	3.01
Poultry	: .90	.83	.99	.95	1.00	1.28	1.18
Chicken	: .78	.82	.99	.94	1.00	1.24	1.19
Whole	: .52	.50	.86	.75	1.00	1.37	1.36
Parts	: .23	1.42	1.19	1.15	1.00	.94	.76
Processed	: .02	1.87	1.95	2.91	1.00	1.38	1.58
Turkey	: .11	1.14	1.20	1.08	1.00	1.61	1.09
Whole	: .07	.98	1.40	1.08	1.00	1.59	.92
Parts	: .04	1.41	.83	1.08	1.00	1.63	1.40
Other	: .01	- .95	- .67	.28	1.00	.85	1.16
Fish and shellfish	: .38	.28	.48	.90	1.00	1.30	1.05
Fish	: .29	.46	.57	.95	1.00	1.39	1.22
Shellfish	: .09	- .32	.19	.73	1.00	1.00	.49
Franks	: .12	1.10	1.56	1.81	1.00	1.08	.76
Luncheon meats	: .26	.52	.89	1.13	1.00	1.07	.60
Variety meats	: .07	1.13	1.24	.74	1.00	1.65	1.71

1/ The standard consumer is taken as one in age group 20-39.

2/ Excluding bacon and sausage.

consumption of 13.25 pounds $(1.00 + 1.00 + .95) \cdot 4.49 = 13.25$.^{20/} Generally, per capita consumption declines as household size increases. This may be due to inadequacies of the scale variables, interactions between household size and other variables (perhaps income) and/or more efficient use of food in larger households. Money values may also differ due to price variation associated with size of purchases.

Race

Tabular analyses presented earlier delineated racial differences in quantity used and money value of meat from home supplies were unadjusted for such factors as income, household regional and urbanizational location, and seasonality. Using the regression results, racial differences in consumption and money value of meats used can be isolated from the above socioeconomic characteristics. The results presented in table 26 are derived after adjustments are made between blacks and nonblacks for differences in income, region, urbanizational location, and season.

Results indicate that blacks consume 62 percent more total meat from home supplies and used meats with a money value 47 percent higher than nonblacks. In virtually every meat category blacks consumed and spent more per person than nonblacks.

Statistically, there was no significant difference between the racial groups for the following meats: Loin and rib steaks (both for quantity and money value), Round and chuck steaks (money value), Turkey (money value), Turkey, whole (both quantity and money value); and Shellfish (both quantity and money value). But, for other meat items, it appears that significant differences exist between nonblack and black households with respect to at-home meat consumption. Whether these differences are attributable to taste and preferences or some other factor excluded from this analysis, such as the value of in-kind social program benefits, is a subject for future research.

Region

The tabular analysis presented earlier revealed that there are regional differences in the per person consumption and money value of meats consumed from home food supplies. Using results from the regression analysis, we isolate the effects of these regional differences by adjusting (holding constant) for differences family size and age composition, the number of guest meals, income, urbanization, season, and race. The adjusted regional differences are reported in table 27 are found to be statistically significant (table 23) for most meat items. Only the quantity of rib and loin steaks, the value and quantity of variety meats and the value and quantity for several poultry subgroups are not found to be significantly influenced by geographic location. Regional variation in total meat consumption is relatively small when compared to regional variation of the various meat subgroups. Thus, regional differences in consumption are primarily due to substitution of one meat item for another.

^{20/} A small adjustment for household size is not included in this computation.

Table 26--Adjusted weekly per person at-home meat consumption and money value, By race, 1977-78

Item	Quantity			Money Value		
	Nonblack	Black	Difference	Nonblack	Black	Difference
	-----Pounds-----	Percent		-----Dollars-----	Percent	
Total meats	3.83	6.19	62	4.67	6.86	47
Red meats	2.34	3.23	38	3.10	4.15	34
Beef	1.53	1.94	27	1.93	2.40	24
Loin and rib						
Steaks	.25	.31	26	.45	.52	16
Roasts	.02	.02	1	.04	.04	0
Round and chuck						
Steaks	.24	.31	30	.32	.40	25
Roasts	.36	.45	27	.44	.57	31
Ground	.56	.62	11	.56	.62	11
Other	.10	.22	117	.13	.25	92
Pork	.76	1.16	53	1.07	1.55	46
Fresh ^{1/}	.28	.48	71	.38	.64	67
Processed ^{1/}	.21	.24	16	.33	.34	3
Bacon and sausage	.27	.44	62	.35	.57	62
Veal	.03	.07	175	.05	.11	104
Lamb, mutton, goat	.03	.05	98	.05	.09	98
Poultry	.81	1.50	85	.61	1.05	74
Chicken	.69	1.31	90	.50	.91	83
Whole	.46	.95	106	.28	.60	111
Parts	.19	.30	58	.17	.25	40
Processed	.03	.05	50	.04	.07	69
Turkey	.12	.19	61	.10	.13	34
Whole	.08	.08	-3	.05	.05	3
Parts	.04	.11	192	.05	.08	67
Other	.01	.01	1	.01	.01	16
Fish and shellfish	.30	.63	113	.49	.80	62
Fish	.24	.56	132	.38	.66	73
Shellfish	.06	.07	29	.11	.14	24
Miscellaneous	.38	.83	118	.48	.85	77
Franks	.12	.19	63	.13	.19	52
Luncheon meats	.20	.33	60	.30	.44	49
Variety meats	.06	.31	428	.05	.22	331

^{1/} Excluding bacon and sausage

^{2/} Less than .005

Table 27--Adjusted weekly per person at-home meat consumption and money value,
By Region, 1977-78

Item	Quantity				Money Value			
	North- : east	North- : central	South : South	West : West	North- : east	North- : central	South : South	West : West
	Pounds	Percent difference			Dollars	Percent difference		
Total meats	4.75	- 4	- 1	-10	6.22	-17	-13	-16
Red meats	2.74	4	0	- 5	3.97	-13	-10	-15
Beef	1.74	9	- 2	2	2.41	-11	-10	- 9
Loin and rib								
Steaks	.29	- 4	3	- 7	.55	-18	1	- 9
Roasts	.03	-39	6	51	.05	-46	-13	26
Round and chuck								
Steaks	.32	-21	-25	-13	.46	-33	-27	-15
Roasts	.35	36	21	5	.49	9	7	- 8
Ground	.58	26	4	13	.65	5	- 7	- 4
Other	.17	-24	-39	- 8	.22	-35	-42	-21
Pork	.87	7	13	-14	1.30	- 3	2	-18
Fresh ^{1/}	.39	- 9	-19	-28	.56	-18	-24	-26
Processed ^{1/}	.24	6	8	-30	.41	- 8	- 7	-38
Bacon and sausage	.24	36	74	26	.33	28	55	20
Veal	.06	-69	-49	-59	.14	-77	-65	-70
Lamb, mutton, goat	.07	-77	-87	- 9	.12	-75	-88	-18
Poultry	1.13	-25	- 7	-22	.91	-32	-21	-23
Chicken	.96	-25	- 5	-22	.76	-33	-21	-23
Whole	.56	- 9	-20	- 6	.37	-18	3	- 5
Parts	.36	-55	-44	-49	.33	-59	-48	-43
Processed	.04	25	- 2	-19	.05	14	-14	-19
Turkey	.16	-24	-16	-16	.15	-32	-27	-24
Whole	.10	-30	-17	-20	.07	-31	-16	-23
Parts	.06	-13	-15	- 9	.08	-33	-38	-24
Other	.01	7	-27	-32	.01	56	21	-33
Fish and shellfish	.39	-27	13	-11	.70	-36	-14	-11
Fish	.33	-20	4	- 5	.56	-34	-25	- 9
Shellfish	.06	-61	63	-40	.13	-49	29	-18
Miscellaneous	.48	15	- 4	- 8	.65	1	-20	-22
Franks	.16	- 8	-16	-26	.19	-16	-24	-35
Luncheon meats	.22	34	4	- 4	.37	15	-18	-16
Variety meats	.10	- 4	3	- 4	.09	-23	- 6	- 9

^{1/} Excluding bacon and sausage

^{2/} Less than .005

Large relative regional differences in consumption are found for shellfish, lamb, veal, loin and rib roasts, and bacon and sausage. Except for bacon and sausage, per person at-home consumption of these items was small. Recognizing this, shellfish consumption was highest in the South and lowest in the Northcentral region. Shellfish consumption in the South was 63 percent higher than in the Northeast and consumption in the Northcentral region was 61 percent less than the Northeast. In the West, shellfish consumption was 40 percent less than in the Northeast. Other things being equal, the largest consumption of lamb, and veal, is in the Northeast region. Except for lamb consumption in the West, which was only about 9 percent less than in the Northeast, other regions consume from 49 to 87 percent less veal and lamb than households in the Northeast. On the other hand, bacon and sausage consumption is lowest in the Northeast and highest in the South. Southerners consume about approximately 50 percent more bacon and sausage than individuals in the other three regions.

In summary, the quantities and money values of individual meats consumed from home supplies are found to vary significantly by geographic region. The variation in money value is generally larger than that for quantities, indicating that price and/or quality variation is greater than quantity variation. Also, total meat consumption varies less across regions than the individual components. This suggests that variation between regions is primarily in the type or cut of meat, rather than the total quantity.

Urbanization

The regression analyses reinforce and quantify the earlier tabular results that showed substantial variation in per capita at-home meat consumption categorized by urbanization. Illustrated in table 28 are the average weekly per capita money value and quantity meat consumption figures for a household residing in a central city and the average consumption for suburban (SMSA, non-central city) and nonmetropolitan areas. The latter are expressed as percentage differences from the central city average. Other household characteristics being the same, persons living in suburban and nonmetropolitan areas consume 7 percent and 9 percent less meat from home supplies, respectively, than persons living in central cities. Similar patterns are found for the money value measure of consumption.

Nonmetropolitan residents consume less of virtually all meats except bacon and sausage, and ground beef, than do similar residents in central cities. The largest disparities exist for loin and rib roasts (50 percent less), veal (55 percent less), lamb, mutton and goat (28 percent less); other poultry (49 percent less), and fish and shellfish (42 percent less). Per capita consumption of bacon and sausage is approximately 19 percent higher in nonmetropolitan areas than in central cities.

Suburban residents consume 30 percent less veal, 24 percent less lamb, mutton and goat, 9 percent less poultry, and 13 percent less fish and shellfish per capita than do similar central city

Table 28--Variation in per capita household at-home meat consumption, By urbanization, 1977-78

Item	Quantity			Money Value		
	Central City:	Suburban	Nonmetro- politan	Central City:	Suburban	Nonmetro- politan
	Pounds	Percent difference		Dollars per week	Percent difference	
Total meats	4.86	- 7	- 9	5.95	- 7	-14
Red meats	2.79	- 3	- 3	3.79	- 4	-10
Beef	1.81	- 4	- 3	2.35	- 4	-10
Loin and rib						
Steaks	.31	- 4	-14	.56	- 2	-22
Roasts	.03	3	-50	.05	6	-55
Round and chuck						
Steaks	.30	-14	- 7	.40	-14	-10
Roasts	.41	1	2	.51	3	- 3
Ground	.62	1	7	.64	- 3	1
Other	.15	-14	-13	.18	-12	-20
Pork	.89	2	2	1.28	0	- 5
Fresh ^{1/}	.35	- 2	-10	.50	- 5	-15
Processed ^{1/}	.23	5	- 2	.38	2	-11
Bacon and sausage	.30	5	19	.40	5	13
Veal	.05	-30	-55	.10	-35	-59
Lamb, mutton, goat	.04	-24	-28	.07	-26	-26
Poultry	1.12	-13	-19	.83	- 9	-22
Chicken	.97	-17	-19	.70	-13	-22
Whole	.68	-25	-16	.42	-26	-21
Parts	.25	3	-29	.22	10	-29
Processed	.04	- 5	- 5	.05	- 4	0
Turkey	.14	11	-20	.12	11	-23
Whole	.09	18	-19	.06	21	-25
Parts	.06	0	-21	.06	1	-22
Other	.01	39	-49	.01	53	-45
Fish and shellfish	.43	-13	-24	.71	-20	-28
Fish	.35	-13	-20	.54	-16	-25
Shellfish	.08	-16	-42	.17	-32	-38
Miscellaneous						
Franks	.14	- 3	3	.16	- 2	- 4
Luncheon meats	.26	- 9	- 7	.38	- 8	-10
Variety meats	.12	-21	-30	.10	-24	-33

^{1/} Consumption is expressed as a percentage difference from Central City average.

residents. However, suburban residents consume 5 percent more bacon and sausage, 18 percent more turkey parts, and 39 percent more other poultry than central city residents with similar characteristics.

Summary of the 1977-78 NFCS

Regression analysis was applied to the 1977-78 USDA Nationwide Food Consumption Survey to quantify and isolate the net effects of selected household socioeconomic and demographic factors on household meat consumption and expenditure behavior. The specific consumer characteristics analyzed were size and age structure of the household, race, income, geographic region and urbanization, location of household, and the season of the year in which the household was surveyed.

Regression equations were specified in per capita units for 30 meat groupings of both quantity and money values of food used from home food supplies. Measures of meat consumed from non-home supplies, such as, school, cafeterias, and restaurants were not available and thus were not included in the analysis.

Consumer responses to changes in income were summarized in the form of quantity, money value, and quality elasticities. The estimated at-home income elasticity for total meat was not found to be significantly different from zero with this data. However, this elasticity was found to vary widely between meat categories with the largest elasticities being associated with the higher priced meats and the smallest (including negative values) being associated with the lower priced meats. Thus, while consumers with different incomes consume about the same amount of meat, those with higher incomes generally consume more of the higher priced meats such as veal, lamb, and rib and loin cuts of beef; and consume and less pork, poultry and chuck, round, ground, and other beef.

Empirical findings from the regression analysis also reveal that there is substantial seasonal variation in at-home consumption of several meat items. However, these seasonal variations tend to be offsetting such that total meat consumption remains relatively stable throughout the year. The seasonal variation tends to be associated with weather conditions and holidays. For example, meats such as ground beef, steaks, and chicken which are frequently cooked on an outdoor grill are consumed more heavily during the spring and summer quarters. Conversely, meats such as whole turkeys, beef and pork roasts which are oven-baked are more heavily consumed in the fall and winter.

The number and age of persons within a household are also important determinants of the total quantity of meat consumed, as would be expected. Persons in the 40-64 age group tend to consume more meat from home supplies than older or younger persons. Households with young children tend to eat more franks and chicken parts while households comprised largely of older individuals tend to eat more lamb, veal, and variety meats. Additionally, per capita consumption is found to decline slightly in larger families.

Region, race, and urbanization also influence the amounts and kinds of meats consumed. Generally, consumers in the Northeast consume and spend more on meat than consumers with similar characteristics in the other three regions of the U.S. A more startling finding is that Blacks consume approximately 62 percent more meat per person from home food supplies than nonblacks with similar characteristics. Black at-home meat consumption tends to be lower priced beef cuts, pork, poultry, fish, luncheon and variety meats.

The choice and amount of meat consumed was also found to be influenced by urbanization of the household residence. Households located in central cities consume 7 to 9 percent more meat per person than similar households located in suburban and nonmetropolitan areas. Suburban residents consumed 30 percent less veal, 24 percent less lamb, mutton, and goat; 9 percent less poultry, and 13 percent less fish and shellfish per capita than do similar central city residents. However, suburban residents also consumed 5 percent more bacon and sausage, 18 percent more turkey parts, and 39 percent more other poultry.

Comparative
Cross-Section
Analysis of At-Home
Consumption Patterns

The previous presentation and analysis of meat consumption and expenditure data provides a snapshot of household behavior patterns for meat consumed at home for 1977-78. This snapshot provides much useful information on the relationship and magnitude of various factors affecting consumption of meat and related products. However, additional information can be provided by comparing snapshots at different points in time and noting significant differences and changes that have occurred. In this context, a comparative analysis of the spring 1965 USDA Household Food Consumption Survey (HFCS) and the spring 1977 Nationwide Food Consumption Survey (NFCS) was conducted.^{21/} In particular, average at-home consumption and expenditure levels are related to the specific socioeconomic and demographic characteristics and compared for the two surveys. Care should be taken in drawing inferences from these comparisons since yearly changes in meat consumption do not follow a simple, straight-line trend projection.

In this section we briefly examine changes in at-home and away-from-home eating patterns, evidence of changes in overall per capita consumption of meats and the allocation of the meat budget, and make tabular comparisons of the surveys grouped according to income, household size, race, region, and urbanization. The final section contains a statistical examination of both food consumption surveys.

^{21/} The cross-section data for each survey were collected over a one year period beginning in April and ending in March of the following year. However, since only data for the spring quarter of the 1965 survey were available on computer tapes, the comparisons were restricted to housekeeping households in the spring quarter of each survey.

Changes in At-home and Away-from-home Eating Patterns

Although the two food consumption surveys do not contain detailed data on away-from-home meat consumption, they do contain information on the number of meals eaten away from home. The percentage of meals that were eaten away from home increased between the two surveys for every meal occasion, regardless of the grouping considered (table 29). Classified by income quintiles, the percentage of total meals that were eaten away from home increased with increasing income in both surveys. However, when particular meal occasions are examined it is apparent that the differences in the percentage of meals eaten away from home narrowed across income quintiles, and in some cases, were eliminated. For instance, households in the lowest income quintile had the smallest percentage of breakfasts and lunches eaten away from home in 1965 while in 1977, households in this quintile consumed a larger proportion of breakfasts and lunches away from home than households in the second or third income quintiles. For the supper meal, the percentage of meals eaten away from home increased with income levels in both surveys. A similar comparison can be made for black and nonblack households. These changes may reflect the growth of social nutrition programs such as school breakfasts, school lunches, and food stamps, that occurred during the period between the surveys.

Grouped by socioeconomic factors other than those discussed above, many interesting comparisons can be made. The purpose in presenting table 29 is to inform the reader that important changes occurred in at-home and away-from-home eating patterns between the surveys. This should be kept in mind when reading the following comparisons--which relate to at-home meat demand only.

Consumption and Budget Shares

Table 30 reveals that weekly per capita consumption of red meats, poultry, fish, and other meats from home supplies declined about 0.7 percent from spring 1965 to spring 1977. The ranking of the meat groups in order of their relative importance in total meat consumption did not change between 1965 and 1977. However, the proportion of the total meat budget allocated to product classes changed in the following manner: red meats down 4 percent, poultry up 1 percent, fish and shellfish up 3 percent, and other meats down slightly (table 31). Major changes in broad meat classifications occurred as follows: per capita beef consumption increased about 8.8 percent, pork consumption declined approximately 15.1 percent, poultry consumption rose 3.7 percent, fish consumption increased 2.8 percent, and veal consumption declined 25 percent. Major changes in budget shares and consumption patterns are summarized for major categories as follows.

Red Meats. The proportion of the total meat budget allocated to red meats was 66.4 percent in 1977 compared to 70.1 percent in 1965. As indicated in table 31, this difference includes a 2-percent change in the share of meat expenditures allocated to pork and a 1-percent change for beef. In addition to these changes in the share of the total meat budget, changes have also occurred in the allocation within the red meat budget, particularly for beef and pork.

Table 29--Percent of meals eaten away from home, By type of meal and selected household characteristics, Spring 1965 and 1977. 1/

Household Characteristic	Meal Type						All Meals	
	Breakfast		Lunch		Supper			
	1965:	1977	1965	1977	1965:	1977	1965	1977
	<u>Percent</u>							
All households	3.7	7.2	18.9	26.7	6.9	12.0	9.8	15.4
Income Quintile:								
1 (lowest)	2.1	7.3	15.5	26.4	3.2	7.3	7.0	13.7
2	3.2	6.4	17.1	23.2	5.7	11.0	8.7	13.7
3	4.1	6.2	18.5	24.3	7.1	12.9	9.9	14.7
4	5.0	7.8	20.6	30.5	8.5	14.3	11.4	17.8
5 (highest)	5.2	8.6	26.0	31.0	12.0	18.3	14.4	19.4
Household size:								
1 member	3.4	5.8	17.1	19.8	11.6	14.8	10.7	13.5
2 members	3.6	6.0	15.9	19.4	8.4	13.1	9.3	13.0
3 members	4.6	9.4	20.1	29.5	8.0	15.2	10.9	18.3
4 members	5.0	8.2	22.2	28.4	8.0	12.2	11.7	16.4
5 members	3.6	5.5	20.3	29.1	6.7	9.4	10.2	14.8
6 or more members	2.6	6.8	17.0	29.7	4.1	8.5	7.9	15.1
Race:								
Black	3.0	9.0	17.3	29.5	2.6	7.9	7.6	15.4
Nonblack	3.8	6.9	19.2	26.3	7.5	12.5	10.2	15.4
Region:								
Northeast	4.3	8.5	19.1	28.0	6.5	12.7	10.0	16.4
Northcentral	3.5	6.3	17.6	26.8	7.1	13.6	9.4	15.8
South	3.5	7.1	20.5	26.7	6.1	9.9	10.0	14.7
West	4.0	6.6	17.6	24.6	8.9	11.8	10.2	14.5
Urbanization <u>2/</u>								
Urban	4.3	7.7	20.1	27.3	7.8	12.8	10.7	16.1
Rural nonfarm	3.6	6.2	18.2	24.7	7.1	10.2	9.6	13.8
Rural farm	3.1	4.6	18.0	29.7	5.3	8.6	8.8	14.6

1/ Meals prepared from home food supplies that are eaten away from home are considered at-home meals.

2/ Since only the 1965 urbanizational categories were available in both surveys, these categories are used in the comparisons.

Table 30--Weekly at-home meat consumption, Spring 1965
and 1977

Item	Year		Change
	1965	1977	
	Pounds per capita		Percent
Total meats	4.42	4.39	- .7
Red meats	2.74	2.70	- 1.5
Beef	1.59	1.73	8.8
Loin and rib			
Steaks	.29	.31	6.9
Roasts	.03	.02	-33.3
Round and chuck			
Steaks	.34	.28	-17.6
Roasts	.38	.39	2.6
Ground	.41	.62	51.2
Other	.13	.11	-15.4
Pork	1.06	.90	-15.1
Fresh ¹ / ₁	.34	.35	2.9
Processed ¹ / ₁	.35	.26	-17.1
Bacon and sausage	.37	.29	-21.6
Veal	.04	.03	-25.0
Lamb, mutton, goat	.04	.04	<u>2/</u>
Poultry	.82	.85	3.7
Chicken	.77	.76	- 1.3
Whole	.63	.52	-17.5
Parts	.12	.21	75.0
Processed	.02	.04	100.0
Turkey	.05	.08	60.0
Whole	.04	.04	<u>2/</u>
Parts	.01	.04	300.0
Other	<u>2/</u>	.01	<u>2/</u>
Fish and shellfish	.36	.37	2.8
Fish	.32	.33	3.1
Shellfish	.04	.04	<u>2/</u>
Miscellaneous	.51	.47	- 7.8
Franks	.16	.15	- 6.3
Luncheon Meats	.25	.24	- 4.0
Variety Meats	.10	.08	-20.0

¹/ Excluding bacon and sausage

2/ Less than .005

Table 31--Household allocation of the total at-home meat budget,
Spring 1965 and 1977

Item	Year			
	1965		1977	
	Percent	Dollars	Percent	Dollars
Total meats	100.0	124.28	100.0	252.77
Red meats	70.1	87.12	66.4	167.84
Beef	42.1	52.32	41.0	103.64
Loin and rib				
Steaks	10.8	13.42	10.1	25.53
Roasts	1.1	1.37	.6	1.52
Round and chuck				
Steaks	9.6	11.93	6.8	17.19
Roasts	10.0	12.43	9.1	23.00
Ground	7.7	9.57	11.7	29.57
Other	3.0	3.73	2.5	6.32
Pork	25.1	31.19	23.1	58.39
Fresh ^{1/}	8.1	10.07	8.5	21.49
Processed ^{1/}	8.9	11.06	7.4	18.70
Bacon and sausage	8.1	10.07	7.0	17.69
Veal	1.5	1.86	1.2	3.03
Lamb, mutton, goat	1.5	1.86	1.2	3.03
Poultry	11.4	14.17	12.4	31.34
Chicken	10.3	12.80	10.9	27.55
Whole	8.1	10.07	6.2	15.67
Parts	1.8	2.24	3.7	9.35
Processed	.4	.50	1.0	2.53
Turkey	.7	.87	1.6	4.04
Whole	.7	.87	.6	1.52
Parts	.4	.50	1.0	2.53
Other	<u>2/</u>	<u>2/</u>	.2	.51
Fish and shellfish	7.7	9.57	10.5	26.54
Fish	6.3	7.83	8.5	21.49
Shellfish	1.5	1.86	1.9	4.80
Miscellaneous	11.1	13.80	10.9	27.55
Franks	3.3	4.10	3.1	7.84
Luncheon meats	6.3	7.83	6.4	16.18
Variety meats	1.5	1.86	1.4	3.54

^{1/} Excluding bacon and sausage

^{2/} Less than .05

The proportions of the red meat budget allocated to beef, pork, veal, and lamb are presented in table 32. Budget proportions for detailed beef and pork categories are contained in table 33.

Beef--Although the proportion of total at-home meat expenditures allocated to beef fell slightly between the two surveys, beef expenditures, as a percentage of the red meat budget, increased approximately 1.7 percent. Per capita consumption of beef at-home increased 8.8 percent. Per capita consumption levels of most beef cuts changed little between the spring of 1965 and 1977 with the major exceptions of round and chuck steaks, and ground beef. At-home ground beef consumption in 1977 was 0.62 pounds per capita per week whereas the comparable figure for 1965 was 0.41 pounds. Weekly per capita consumption of round and chuck steaks was 0.34 pounds in 1965 and fell to 0.28 pounds in 1977. The proportion of beef expenditures allocated to ground beef rose 10 percent during this period while the proportion spent on all other beef categories declined.

Pork--The percentage of the total at-home meat budget allocated to pork decreased about 2 percent between 1965 and 1977. Pork expenditures, as a proportion of the red meat budget, declined less than 1 percent, but per capita consumption declined by more than 15 percent.

Table 32--Allocation of at-home red meat and poultry budgets, Spring 1965 and 1977

Item	Year	
	1965	1977
	<u>Percent</u>	
Red Meat	100.0	100.0
Beef	60.0	61.7
Pork	35.8	34.8
Veal	2.1	1.8
Lamb, mutton, goat	2.1	1.8
Poultry	100.0	100.0
Chicken	91.6	87.5
Turkey	7.5	12.5
Other	0.8	1.6

Large shifts in quantities consumed from home supplies and expenditures occurred within the pork group (tables 29 and 33). As a percentage of the pork budget, expenditures on fresh pork increased about 4.6 percent from 1965 to 1977. Per capita quantities of fresh pork consumed at-home remained relatively stable. Conversely, the proportion of total pork expenditures spent on processed pork (excluding bacon and sausage) declined over 3.4 percent and quantities consumed declined about 17.1 percent. The proportion of the pork budget spent on bacon and sausage declined about 2 percent from 1965 to 1977, but per capita quantities consumed from home supplies declined 22 percent.

Veal--The share of the red meat budget spent on veal dropped from 2.1 percent in 1965 to 1.8 percent in 1977. Per capita consumption of veal from home supplies, small in both surveys, declined about 25 percent between 1965 and 1977.

Lamb--Expenditures on lamb as a percentage of the red meat budget declined between the two periods--from 2.1 to 1.8 percent. At-home per capita lamb consumption, also small in both surveys, remained unchanged from 1965 to 1977.

Poultry. The proportion of the total meat budget spent on poultry increased approximately 1.0 percent during the period 1965 to 1977. Likewise, per capita weekly at-home consumption of poultry increased from 0.82 pounds in 1965 to 0.85 pounds in 1977-- about 3.7 percent. As with other meats, some important changes have occurred within the poultry group.

Chicken--Per capita at-home chicken consumption remained about the same in 1977 as in 1965, but the level of processing changed significantly. Per capita consumption of whole chickens declined over 17 percent while consumption of chicken parts increased about 75 percent. Expenditures on whole chickens, as a proportion of the expenditures on total chicken, declined about 20 percent and expenditures for chicken parts increased approximately 16 percent.

Turkey--The small increase in at-home poultry consumption between the two surveys can be attributed largely to the increased at-home consumption of turkey. Per capita at-home turkey consumption increased about 60 percent from 1965 to 1977, and the proportion of the poultry budget increased 5 percent. Changes in at-home turkey consumption also reflected a change to higher levels of processing. Consumption levels of whole turkey did not change, but the consumption of turkey parts increased from 0.01 to 0.04 pounds per capita per week. Expenditures on whole turkeys, expressed as a percentage of the total turkey expenditures, showed a decline from 71.4 percent in 1965 to 37.5 percent in 1977. The proportion of at-home turkey expenditures allocated to turkey parts increased from 28.6 to 62.5 percent.

Fish and Shellfish. Per capita consumption of fish and shellfish from home supplies increased about 3 percent between 1965 and 1977 and the share of the total meat budget allocated to these foods increased about 2.8 percent. The share of total expenditure on fish and shellfish spent for fish increased about 0.5 percent from 1965 to 1977 while the share spent on shellfish decreased by a similar amount. Per capita quantities of the major component, fish, increased 3.1 percent while shellfish consumption was virtually unchanged.

Table 33--Allocation of the at-home meat budget, By major subgroups, Spring 1965 and 1977

Item	Year	
	1965	1977
	<u>Percent</u>	
Beef	100.0	100.0
Loin and rib		
Steaks	25.4	24.6
Roasts	2.6	1.4
Round and chuck		
Steaks	22.8	16.6
Roasts	23.7	22.3
Ground	18.4	28.4
Other	7.0	6.2
Pork	100.0	100.0
Fresh ^{1/}	32.4	37.0
Processed ^{1/}	35.3	31.9
Bacon and sausage	32.4	30.3
Chicken	100.0	100.0
Whole	78.6	57.1
Parts	17.9	33.9
Processed	3.6	8.9
Turkey	100.0	100.0
Whole	71.4	37.5
Parts	28.6	62.5
Fish and shellfish	100.0	100.0
Fish	81.0	81.5
Shellfish	19.0	18.5

^{1/} Excluding bacon and sausage.

Frankfurters, Luncheon Meats, and Variety Meats. Per capita consumption of these items fell slightly from 1965 to 1977. The share of the total meat budget allocated to frankfurters, variety meats, and luncheon meats also declined.

Relationships
of Income and
Socioeconomic
Characteristics
with Meat Con-
sumption and
Expenditures

The previous section examined changes in per capita at-home meat consumption and expenditure between 1965 and 1977 for all households in the surveys. This section describes the similarities and differences in meat consumption across income classes, races, regional location of household residence, and different household sizes. The association of each of these household characteristics with observed at-home meat consumption is presented in tabular form along with a discussion of the highlights.

Income. To examine the relationship of income to at-home meat consumption patterns, households in the spring 1965 HFCS and the spring 1977 NFCS were divided into five equal size groups (quintiles) according to the level of reported household money income.^{22/} Those households with the lowest incomes are in the first quintile and those with the highest incomes are in the fifth quintile. Tables 34 and 35 contain weekly per capita at-home consumption data for households in each quintile corresponding to the 1965 and 1977 surveys.

Between the two surveys, households in the lowest income quintile increased per capita consumption levels of total red meats, poultry, and fish while consumption levels for households in the highest income quintiles decreased. The 1965 data indicate that total per capita meat consumption at-home increased as income increased--the lowest quintile consumed 4.11 pounds per person and the highest quintile consumed 4.61 pounds per person. The opposite relationship exists in the 1977 survey--the lowest quintile consumed 4.71 pounds per person per week and the highest income class consumed 4.37 pounds.

Red meat consumption by individuals in the lowest income quintile increased about 12 percent between 1965 and 1977 while per capita consumption of red meat for the highest quintile declined about 7.6 percent. The changes in red meat consumption by the lowest quintile were primarily due to a 31.3-percent increase in the consumption of beef. This increase was somewhat tempered by a 10.8-percent decline in pork consumption. The highest income quintile consumed about the same quantity of beef, less pork, poultry, and lamb in 1977 than in 1965.

Differences in per capita consumption of beef across the income quintiles narrowed considerably between 1965 and 1977. In 1977, the highest income quintile consumed about 20 percent more beef than the lowest quintile. This compares to a difference of about 58 percent in 1965.

^{22/} Households who did not report their income are excluded from this portion of the analysis.

Table 34--Weekly home meat consumption, By income quintile,
Spring 1965

Item	Income Quintile				
	I (lowest)	II	III	IV	V (highest)
	Pounds per capita				
Total meats	4.11	4.19	4.47	4.58	4.61
Red meats	2.35	2.52	2.75	2.93	2.98
Beef	1.18	1.38	1.64	1.75	1.87
Loin and rib					
Steaks	.15	.19	.27	.36	.44
Roasts	.02	.02	.03	.03	.06
Round and chuck					
Steaks	.23	.26	.35	.38	.43
Roasts	.25	.30	.41	.43	.46
Ground	.36	.46	.45	.44	.36
Other	.17	.14	.12	.12	.11
Pork	1.13	1.08	1.03	1.09	.98
Fresh <u>1/</u>	.30	.36	.34	.38	.32
Processed <u>1/</u>	.39	.34	.33	.36	.34
Bacon and sausage	.44	.39	.35	.35	.33
Veal	.02	.03	.04	.05	.05
Lamb, mutton, goat	.02	.03	.04	.04	.08
Poultry	.85	.82	.81	.81	.80
Chicken	.82	.77	.76	.76	.73
Whole	.70	.68	.63	.62	.56
Parts	.10	.08	.12	.12	.16
Processed	.01	.02	.01	.02	.02
Turkey	.02	.04	.04	.05	.06
Whole	.01	.03	.04	.04	.05
Parts	.01	.01	.01	.01	.01
Other	<u>2/</u>	.01	<u>2/</u>	<u>2/</u>	<u>2/</u>
Fish and shellfish	.42	.33	.34	.35	.37
Fish	.40	.31	.31	.31	.30
Shellfish	.02	.02	.03	.04	.07
Miscellaneous	.49	.52	.57	.49	.46
Franks	.13	.16	.18	.17	.15
Luncheon Meats	.22	.24	.29	.25	.23
Variety Meats	.14	.12	.10	.07	.08

1/ Excluding bacon and sausage

2/ Less than .005

Table 35--Weekly home meat consumption, By income quintile, Spring 1977

Item	Income Quintile				
	I	II	III	IV	V
	:(lowest)				:(highest)
	Pounds per capita				
Total meats	4.71	4.19	4.14	4.38	4.37
Red meats	2.63	2.56	2.60	2.72	2.77
Beef	1.55	1.61	1.64	1.77	1.87
Loin and rib					
Steaks	.17	.28	.26	.33	.40
Roasts	.03	.01	.02	.02	.04
Round and chuck					
Steaks	.29	.28	.25	.26	.27
Roasts	.34	.34	.38	.42	.42
Ground	.58	.60	.64	.64	.63
Other	.14	.10	.09	.11	.11
Pork	1.02	.91	.89	.91	.80
Fresh <u>1/</u>	.38	.36	.35	.35	.29
Processed <u>1/</u>	.28	.25	.25	.27	.28
Bacon and sausage	.36	.30	.29	.28	.23
Veal	.03	.02	.03	.02	.05
Lamb, mutton, goat	.03	.02	.04	.02	.05
Poultry	1.00	.82	.73	.80	.86
Chicken	.92	.75	.68	.68	.73
Whole	.65	.55	.49	.43	.43
Parts	.24	.17	.16	.20	.25
Processed	.03	.03	.03	.05	.05
Turkey	.08	.06	.05	.12	.12
Whole	.03	.02	.02	.06	.07
Parts	.05	.04	.03	.06	.06
Other	.01	.01	.01	<u>2/</u>	.01
Fish and shellfish	.46	.31	.34	.38	.37
Fish	.41	.30	.30	.34	.30
Shellfish	.05	.02	.04	.03	.07
Miscellaneous	.61	.49	.46	.48	.37
Franks	.17	.15	.14	.16	.13
Luncheon meats	.26	.23	.25	.26	.20
Variety meats	.18	.11	.07	.06	.04

1/ Excluding bacon and sausage2/ Less than .005

Per capita at-home pork consumption declined for households in each income quintile. In addition, the negative relationship observed between income and per capita pork consumption in 1965 is more pronounced in 1977. In 1965, the higher income quintiles consumed larger quantities of fresh pork than the lower income quintiles, but in 1977, the lowest income quintile consumed 27.5 percent more pork than the highest income quintile. In 1977, the lower income quintiles consumed more bacon and sausage, and fresh pork, than the higher income quintiles, but processed pork consumption was approximately the same across income quintiles. Bacon and sausage consumption declined between 1965 and 1977 for all but the lower income quintiles. The latter were the predominate consumers of bacon sausage in both survey periods.

Veal and lamb were consumed in larger quantities by the higher income groups in both 1965 and 1977. However, there were no major changes in the at-home consumption of veal and lamb across quintiles between the two surveys.

Per capita at-home poultry consumption increased for the lowest and highest income groups between 1965 and 1977, while at-home consumption for the middle three quintiles either remained the same or declined. For each income quintile, there was a net decline in per capita at-home consumption of whole chicken but the consumption of chicken parts and processed chicken increased.

All income quintiles consumed turkey in larger quantities in 1977 than in 1965. Higher income groups in both years consumed larger quantities of turkey than the lower income groups. For all income quintiles, processed turkey and turkey parts have grown substantially in importance as a proportion of total quantities consumed at home.

Per capita at-home fish consumption from home increased slightly from 1965 to 1977, while shellfish consumption remained virtually unchanged between the surveys. Both surveys indicate that lower income groups consume more fish at-home than their higher income counterparts. On the other hand, the highest income quintile consumed more shellfish than lower income groups.

In 1965, the lower income quintiles had lower per capita consumption levels of frankfurters and luncheon meats than the higher income quintiles. This relationship was reversed in 1977.

Household Size. Per capita meat data classified by household size indicate that between 1965 and 1977 consumption of total red meat, poultry, and fish declined for all household sizes of less than five persons, but increased by a large amount for households with six or more members (tables 36 and 37). The decline in per capita at-home consumption for two, three, and four member households was relatively large when compared to the decline for one and five member households.

Table 36--Weekly home meat consumption, By household size, Spring 1965

Item	Household size					
	1	2	3	4	5	6 or more
	Pounds per capita					
Total meats	5.39	5.74	5.12	4.41	4.07	3.49
Red meats	3.23	3.66	3.26	2.78	2.55	2.04
Beef	1.83	2.16	1.86	1.64	1.52	1.17
Loin and rib						
Steaks	.35	.48	.38	.32	.27	.16
Roasts	.03	.06	.04	.04	.02	.02
Round and Chuck						
Steaks	.44	.45	.40	.36	.33	.33
Roasts	.44	.54	.45	.38	.37	.25
Ground	.36	.45	.44	.41	.42	.40
Other	.21	.17	.15	.12	.11	.11
Pork	1.25	1.36	1.29	1.06	.96	.82
Fresh <u>1/</u>	.37	.40	.44	.35	.30	.26
Processed <u>1/</u>	.40	.47	.42	.34	.32	.27
Bacon and sausage	.48	.49	.42	.37	.33	.28
Veal	.05	.05	.05	.04	.03	.03
Lamb, mutton, goat	.10	.09	.06	.04	.04	.02
Poultry	1.20	1.10	.91	.78	.73	.65
Chicken	1.17	1.03	.85	.73	.69	.60
Whole	.88	.83	.67	.60	.59	.52
Parts	.24	.17	.14	.12	.09	.08
Processed	.04	.02	.03	.01	.01	.01
Turkey	.03	.06	.05	.04	.04	.04
Whole	.02	.05	.04	.03	.03	.04
Parts	.01	.02	.01	.01	.01	<u>2/</u>
Other	<u>2/</u>	.01	.01	<u>2/</u>	<u>2/</u>	.01
Fish and shellfish	.48	.48	.42	.35	.30	.29
Fish	.44	.43	.37	.30	.26	.26
Shellfish	.04	.05	.05	.04	.04	.02
Miscellaneous	.48	.50	.53	.50	.49	.51
Franks	.13	.13	.16	.18	.16	.17
Luncheon meats	.19	.25	.27	.24	.25	.24
Variety meats	.16	.12	.10	.08	.08	.10

1/ Excluding bacon and sausage2/ Less than .005

Table 37--Weekly home meat consumption, By household size, Spring 1977

Item	Household size					
	1	2	3	4	5	6 or more
	Pounds per capita					
Total meats	5.34	5.18	4.46	4.05	4.16	3.82
Red meats	3.06	3.22	2.81	2.49	2.49	2.37
Beef	1.85	2.04	1.85	1.61	1.60	1.52
Loin and rib						
Steaks	.35	0.42	0.32	.28	.30	.20
Roasts	.02	0.04	0.03	.02	.03	.01
Round and chuck						
Steaks	.29	.31	.30	.23	.27	.29
Roasts	.46	.54	.41	.34	.33	.32
Ground	.56	.60	.68	.62	.60	.63
Other	.16	.14	.11	.12	.07	.07
Pork	1.07	1.09	.90	.81	.84	.80
Fresh <u>1/</u>	.38	.36	.33	.33	.38	.32
Processed <u>1/</u>	.31	.36	.25	.22	.23	.22
Bacon and sausage	.37	.37	.32	.26	.23	.26
Veal	.06	.05	.03	.02	.02	.02
Lamb, mutton, goat	.08	.03	.03	.04	.03	.03
Poultry	1.19	1.02	.81	.80	.84	.68
Chicken	1.14	.91	.70	.73	.74	.59
Whole	.68	.65	.47	.48	.48	.45
Parts	.41	.22	.20	.21	.22	.13
Processed	.05	.05	.03	.04	.04	.02
Turkey	.04	.10	.09	.07	.09	.09
Whole	<u>2/</u>	.05	.05	.03	.06	.05
Parts	.04	.05	.04	.04	.04	.04
Other	.01	.01	.01	<u>2/</u>	.01	<u>2/</u>
Fish and shellfish	.51	.47	.37	.31	.38	.28
Fish	.45	.42	.32	.28	.33	.26
Shellfish	.06	.05	.06	.03	.05	.02
Miscellaneous	.58	.48	.46	.45	.45	.48
Franks	.12	.13	.14	.16	.16	.16
Luncheon meats	.24	.25	.24	.22	.22	.25
Variety meats	.22	.10	.08	.07	.07	.07

1/ Excluding bacon and sausage2/ Less than .005

In general, both surveys indicate that per capita quantities of meat consumed at home decline as household size increases. Since larger households usually have a higher proportion of children than small households and most children consume less meat than adults, this is understandable. Consumption of beef by two member households, for example, was at least 10 percent higher than for households with three or more members in both surveys. This same relationship holds for pork, poultry, and fish. On the other hand, frankfurters were consumed in larger quantities by larger households, reflecting the influence of the family composition on the consumption of this item. The influence of family composition on the consumption of luncheon meats is also apparent from examination of the tables.

Race. Tables 38 and 39 contain per capita at-home consumption and money value data grouped into black and nonblack subsamples. Blacks consumed more meat from home supplies than nonblacks in both survey years--about 2.5 percent more in 1965 and about 36 percent more in 1977. While blacks consumed larger quantities of meats at home than nonblacks in both years, expenditures by blacks were about 22 percent lower in 1965 and only about 20 percent higher in 1977. This is due to the fact that blacks tend to consume more meats and meat cuts which are less expensive than those consumed by nonblacks. For example, in 1977, nonblacks spent 54 cents per person per week on loin and rib steaks compared to 40 cents for blacks. Also, blacks spent 23 cents per week on variety meats compared to only about 4 cents for nonblacks.

In 1977, blacks consumed about 57.5 percent more beef, about the same amount of pork, 25.7 percent more poultry, and 14.8 percent more fish and shellfish than in 1965. Nonblacks differed considerably in that they consumed 3 percent more beef, 18 percent less pork, 1 percent more poultry, and 3 percent more fish and shellfish in 1977.

Of the miscellaneous meat category (franks, luncheon meats, variety meats), nonblacks decreased consumption of each item. Conversely, blacks increased the consumption of each. In 1965, blacks and nonblacks consumed about the same quantity of franks, but blacks consumed less luncheon meats. In 1977, blacks consumed more of each item than nonblacks. Nonblacks consumed considerably less variety meats at home than blacks in both 1965 and 1977.

In summary, it appears that there is considerable difference between black and nonblack consumption of meat at home. Thus, blacks exert a greater influence on the at-home meat market than their share of the population would indicate. This is particularly true for pork, poultry, fish, and variety meats. In addition, other studies indicate that blacks have a strong preference for meats versus meat substitutes such as dairy products and fruits and vegetables. See, for example, (3).

Table 38--Weekly home meat consumption, By race, Spring 1965 and 1977

Item	Year			
	1965		1977	
	Black	Nonblack	Black	Nonblack
	Pounds per capita			
Total meats	4.54	4.43	5.72	4.21
Red meats	2.30	2.83	2.96	2.66
Beef	1.06	1.69	1.67	1.74
Loin and rib				
Steaks	.16	.33	.26	.32
Roasts	.01	.04	.03	.02
Round and chuck				
Steaks	.20	.36	.32	.27
Roasts	.21	.41	.39	.39
Ground	.30	.44	.50	.64
Other	.18	.12	.18	.10
Pork	1.16	1.05	1.18	.86
Fresh ^{1/}	.35	.34	.54	.32
Processed ^{1/}	.37	.35	.24	.26
Bacon and sausage	.43	.36	.40	.28
Veal	.03	.04	.05	.03
Lamb, mutton, goat	.05	.05	.05	.03
Poultry	1.05	.78	1.32	.79
Chicken	1.01	.74	1.20	.70
Whole	.87	.60	.90	.46
Parts	.13	.12	.26	.20
Processed	.01	.02	.04	.04
Turkey	.04	.05	.12	.08
Whole	.03	.04	.04	.04
Parts	.01	.01	.08	.04
Other	<u>2/</u>	.01	<u>2/</u>	.01
Fish and shellfish	.54	.33	.62	.34
Fish	.51	.29	.58	.29
Shellfish	.03	.04	.04	.04
Miscellaneous	.30	.48	.82	.42
Franks	.17	.16	.21	.14
Luncheon meats	.23	.25	.29	.23
Variety meats	.26	.07	.32	.05

^{1/} Excluding bacon and sausage2/ Less than .005

Table 39--Money value of weekly home meat consumption, By race,
Spring 1965 and 1977.

Item	Year			
	1965		1977	
	Black	Nonblack	Black	Nonblack
	Dollars per capita			
Total meats	2.29	2.80	6.04	5.03
Red meats	1.41	1.99	3.61	3.39
Beef	.69	1.22	1.97	2.13
Loin and rib				
Steaks	.15	.32	.40	.54
Roasts	.01	.03	.03	.04
Round and chuck				
Steaks	.15	.28	.41	.35
Roasts	.14	.29	.45	.47
Ground	.14	.22	.50	.62
Other	.10	.08	.18	.12
Pork	.66	.69	1.48	1.15
Fresh <u>1/</u>	.22	.22	.66	.41
Processed <u>1/</u>	.20	.24	.32	.39
Bacon and sausage	.35	.22	.50	.35
Veal	.02	.04	.09	.06
Lamb, mutton, goat	.04	.04	.08	.06
Poultry	.35	.30	.91	.60
Chicken	.33	.28	.83	.52
Whole	.29	.21	.59	.29
Parts	.04	.06	.21	.18
Processed	<u>2/</u>	.01	.04	.05
Turkey	.02	.03	.07	.08
Whole	.01	.02	.03	.03
Parts	.01	.01	.05	.05
Other	<u>2/</u>	<u>2/</u>	<u>2/</u>	.01
Fish and shellfish	.23	.21	.73	.51
Fish	.21	.17	.63	.42
Shellfish	.02	.04	.10	.10
Miscellaneous	.30	.30	.79	.52
Franks	.09	.09	.20	.15
Luncheon meats	.13	.17	.36	.33
Variety meats	.08	.04	.23	.04

1/ Excluding bacon and sausage

2/ Less than .005

Region. Significant differences in regional meat consumption patterns and changes in these patterns emerge from a comparison of the surveys. Tables 40 and 41 contain the per capita meat consumption data broken down into four regional classifications: Northeast, Northcentral, South, and West.

Total at-home red meat, poultry, and fish consumption data reveal significant changes between the two surveys for all regions except for the Northeast. Between 1965 and 1977, at-home total meat consumption data indicate that households located in the northcentral and western United States decreased consumption by a significant amount, while per capita total meat consumption in the South rose by a large amount (0.47 pounds per week).

Red meat consumption declined for all regions except the South. The smallest decline was observed for the Northeast where per capita at-home red meat consumption changed from 2.68 to 2.62 pounds per week. The largest decline was observed for households in the western United States which, on a per capita basis, were the largest consumers of red meats in 1965 and the smallest in 1977. According to the two surveys, westerners consumed 0.32 pounds less red meat per week in 1977 than in 1965. Given the observed decline in at-home per capita red meat consumption for three of the four regions, it is of particular interest that households in the South increased their consumption by a significant amount. Per capita at-home red meat consumption in the South increased from 2.50 to 2.77 pounds per person between 1965 and 1977. The increase in at-home red meat consumption in the South can be attributed entirely to an increase in per capita at-home beef consumption of approximately 0.4 pounds per capita. An increase in at-home beef consumption was also observed for households in the Northeast, but per capita consumption fell slightly in the northcentral region. The slight decline in at-home beef consumption observed for the northcentral region should be kept in perspective - households in this region were the largest consumers of beef in 1977. The decline in per capita beef consumption (from 1.85 to 1.70 pounds) observed for western households is significant since per capita beef consumption in this region was the largest of all regions in 1965.

At-home pork consumption, on a per capita basis, declined in each region between the surveys. Of particular interest is the large decline (0.19 pound per week) in at-home consumption observed for the northcentral region--traditionally large consumers of pork. Households in the western region also decreased per capita at-home pork consumption by a relatively large amount between the two surveys. Per capita at-home pork consumption levels of westerners were the smallest of all regions in both 1965 and 1977.

Both surveys reveal that northeastern households are much larger consumers of veal, on a per capita basis, than households in any other region. The decline in veal consumption of 30 percent per person observed for this region is given added

Table 40--Weekly home meat consumption, By region, Spring 1965

Item	Region			
	North- east	North- central	South	West
	<u>Pounds per capita</u>			
Total meats	4.41	4.58	4.29	4.43
Red meats	2.68	3.00	2.50	2.86
Beef	1.57	1.81	1.33	1.85
Loin and rib				
Steaks	.31	.32	.25	.33
Roasts	.04	.04	.02	.05
Round and chuck				
Steaks	.42	.31	.26	.49
Roasts	.38	.45	.30	.42
Ground	.30	.56	.37	.41
Other	.12	.13	.13	.15
Pork	.92	1.14	1.13	.91
Fresh ^{1/}	.34	.40	.30	.33
Processed ^{1/}	.33	.38	.37	.26
Bacon and sausage	.26	.36	.46	.33
Veal	.09	.03	.02	.02
Lamb, mutton, goat	.10	.02	.02	.08
Poultry	.84	.74	.87	.78
Chicken	.76	.69	.84	.73
Whole	.55	.58	.74	.62
Parts	.19	.10	.09	.09
Processed	.02	.01	.01	.02
Turkey	.08	.04	.03	.05
Whole	.07	.04	.02	.03
Parts	.01	.01	.01	.01
Other	<u>2/</u>	.01	<u>2/</u>	<u>2/</u>
Fish and shellfish	.36	.28	.45	.30
Fish	.30	.26	.41	.26
Shellfish	.07	.02	.04	.03
Miscellaneous	.52	.56	.47	.49
Franks	.18	.18	.14	.16
Luncheon meats	.24	.30	.22	.23
Variety meats	.10	.08	.11	.10

^{1/} Excluding bacon and sausage^{2/} Less than .005

Table 41--Weekly home meat consumption; By region, Spring 1977

Item	Region			
	North- east	North- central	South	West
	<u>Pounds per capita</u>			
Total meats	4.43	4.40	4.59	3.96
Red meats	2.62	2.79	2.77	2.54
Beef	1.69	1.80	1.72	1.70
Loin and rib				
Steaks	.33	.32	.29	.29
Roasts	.03	.01	.03	.03
Round and chuck				
Steaks	.32	.25	.25	.31
Roasts	.38	.43	.40	.35
Ground	.54	.71	.63	.59
Other	.09	.08	.12	.13
Pork	.81	.95	1.02	.73
Fresh ^{1/}	.36	.37	.36	.25
Processed ^{1/}	.24	.29	.26	.23
Bacon and sausage	.21	.28	.40	.24
Veal	.06	.02	.02	.03
Lamb, mutton, goat	.06	.02	.01	.07
Poultry	.99	.77	.91	.69
Chicken	.87	.68	.83	.60
Whole	.50	.48	.62	.41
Parts	.32	.15	.18	.16
Processed	.05	.04	.02	.03
Turkey	.11	.08	.07	.09
Whole	.05	.05	.03	.03
Parts	.05	.03	.04	.06
Other	.01	.01	<u>2/</u>	.01
Fish and shellfish	.41	.31	.43	.31
Fish	.34	.29	.38	.26
Shellfish	.07	.02	.05	.04
Miscellaneous	.43	.53	.47	.32
Franks	.16	.15	.14	.13
Luncheon meats	.20	.30	.22	.21
Variety meats	.07	.08	.11	.08

^{1/} Excluding bacon and sausage^{2/} Less than .005

significance since the northeastern region is densely populated, relative to the other regions.

Lamb, mutton, and goat consumption is also highly regionalized with households in the Northeast and West being the predominant consumers of these products. Per capita at-home consumption of this product group declined for three of the four regions with a decline of 0.04 pounds per person per week in the Northeast being the most significant change observed.

Per capita at-home poultry consumption increased significantly between the surveys for households in the Northeast region and declined significantly for households in the West. Small increases in poultry consumption were observed for households in the northcentral and southern regions. The regional breakdown of at-home poultry consumption data indicates that households in all regions shifted the mix of poultry consumption toward more parts and processed products. Per capita at-home consumption of whole chicken declined in all regions but the decline was offset somewhat by increases in the consumption of chicken parts. At-home consumption of turkey parts also increased for households in all regions with the most significant increases occurring in the West and Northeast.

Fish and shellfish consumption increased slightly between 1965 and 1977 for all regions except the West where consumption of these products remained stable. There is some variation in fish and shellfish consumption across regions. In both surveys, households in the southern United States are the largest consumers of fish in and households in the Northeast are the largest consumers of shellfish.

Urbanization. Categorized by urbanizational location of households, several significant differences in meat consumption patterns emerge (Table 42). In both surveys, rural farm households consumed significantly more total meats than households in other urbanizations, and the difference was concentrated in the red meat categories. Between 1965 and 1977, urban and rural nonfarm at-home meat consumption patterns changed in a manner similar to other socioeconomic groupings. For these households, total red meat, poultry, and fish consumption changed little, beef consumption increased, pork consumption decreased, and there was a shift from whole chicken and turkeys to poultry parts. Changes in farm household consumption are interesting in that they differ considerably from nonfarm households--whether rural or urban. Farm households increased at-home beef consumption by a large amount--0.55 pounds per capita per week, whereas pork consumption was virtually unchanged. Farm households also decreased per capita at-home consumption of poultry by a large amount. The decline in farm household consumption of whole chickens was consistent with other urbanizations but farm households did not exhibit a corresponding increase in the consumption of chicken parts.

Table 42--Weekly home meat consumption, By urbanization, Spring 1965 and 1977

Item	Urban		Rural			
			Farm		Nonfarm	
	1965	1977	1965	1977	1965	1977
	<u>Pounds per capita</u>					
Total meats	4.47	4.42	4.64	5.19	4.10	4.17
Red meats	2.74	2.67	2.95	3.75	2.49	2.59
Beef	1.61	1.71	1.79	2.59	1.46	1.66
Loin and rib						
Steaks	.31	.32	.33	.62	.24	.23
Roasts	.04	.03	.06	.05	.03	.01
Round and chuck						
Steaks	.38	.28	.31	.37	.28	.26
Roasts	.40	.38	.41	.56	.33	.40
Ground	.35	.60	.53	.88	.46	.65
Other	.13	.11	.15	.10	.12	.10
Pork	1.01	.88	1.15	1.13	.99	.90
Fresh ^{1/}	.36	.35	.31	.29	.27	.33
Processed ^{1/}	.32	.25	.43	.43	.33	.26
Bacon and sausage	.33	.28	.41	.41	.38	.31
Veal	.06	.04	.01	^{2/}	.02	.01
Lamb, mutton, goat	.07	.04	.01	.03	.02	.02
Poultry	.85	.89	.80	.64	.74	.78
Chicken	.79	.79	.77	.59	.70	.70
Whole	.62	.51	.72	.54	.58	.54
Parts	.15	.24	.03	.03	.11	.14
Processed	.02	.04	.02	.02	.01	.03
Turkey	.05	.09	.03	.03	.04	.08
Whole	.04	.05	.01	.02	.04	.04
Parts	.01	.05	.01	.01	.01	.04
Other	^{2/}	.01	.01	.03	.01	^{2/}
Fish and shellfish	.35	.39	.37	.37	.37	.33
Fish	.30	.34	.35	.36	.33	.30
Shellfish	.05	.05	.02	.01	.04	.03
Miscellaneous	.52	.47	.52	.43	.51	.47
Franks	.16	.14	.15	.12	.18	.17
Luncheon meats	.25	.24	.26	.21	.25	.24
Variety meats	.11	.09	.11	.10	.08	.06

^{1/} Excluding bacon and sausage^{2/} Less than .005

Statistical
Analysis of
Spring 1965
and Spring 1977
Food Consumption
Surveys

The comparison of the data contained in the spring 1965 HFCS and the spring 1977 NFCS indicates the apparent influence of various socioeconomic characteristics on meat consumption and expenditures. However, tabular comparisons do not provide information on the net effect of the various factors, the magnitude of their individual influence, or whether the influence of these factors has changed over time. These limitations are parallel to the same as those outlined for the tabular analyses from the complete 1977-78 NFCS (see page 36).

To further examine what factors have influenced the reported changes in household consumption of meats, poultry, and fish between the Spring 1965 and 1977 samples, a statistical regression analysis was performed. In this analysis, we examined whether or not the estimated behavioral response parameters such as quantity, expenditure and quality elasticities have changed significantly, and if they have changed, by how much. The model used was similar to the one used for the analysis of the full 1977-78 NFCS sample, except that the seasonal variables are excluded since only the spring quarters are examined. Three adjustments are made to the data to maintain consistency between the two samples. First, the money value of food used in 1965 was adjusted upwards to spring 1977 values using the ratio of average implicit prices (money value divided by quantity) for the individual items in each period. Second, since after tax income was reported by income groups in 1965 and actual amounts were reported in 1977, two adjustments were made to the income variable to maintain consistency. The income variable for 1965 was assigned values equal to the midpoints of the reported income groups and then adjusted to 1977 price levels using the consumer price index. The 1977 income variable was placed in similar income intervals and assigned values equal to the midpoints of these intervals. The third adjustment made was to the urbanization variable relating to residential location. Since only the 1965 urbanization categories were available in both samples, these categories (urban and rural) were used in both periods.^{22/}

Expenditure, Quantity, and Quality Elasticities. Presented in table 43 are the expenditure, quantity, and quality elasticities for individual meat items. For virtually every meat item, the expenditure and quantity elasticities are smaller in absolute value in 1977 than in 1965. These results indicate that there may be a tendency toward decreasing preference in demand for meat and meat items consumed at home, especially with respect to lower priced items. Loin and rib steaks, chicken parts, other poultry, and shellfish were among the few items for which the expenditure elasticities increased between the two surveys. For these items, changes in household food expenditures in response to income changes have increased over time.

^{22/} Complete regression results for the Spring 1965 HFCS and Spring 1977 NFCS are contained in appendix tables 9 and 10.

Table 43--Expenditure, quantity, and quality elasticities, Spring 1965 and 1977. 1/

Item	Expenditure		Quantity		Quality	
	Elasticity		Elasticity		Elasticity	
	1965	1977	1965	1977	1965	1977
Total meats	0.18*** <u>2/</u>	0.15	0.09***	0.03	0.09	0.12
Red meats	.21***	.18	.13***	.06	.08	.12
Beef	.28***	.25	.19***	.13	.09	.12
Loin and rib						
Steaks	.59	.67	.55	.52	.04	.15
Roasts	.52	.49	.49***	.25	.03	.24
Round and chuck						
Steaks	.21***	.00	.18***	-.02	.03	.02
Roasts	.25	.33	.18	.25	.07	.08
Ground	-.04	-.04	-.07	-.07	.03	.03
Other	.05	.18	-.03	-.02	.08	.20
Pork	.08	.02	.01	-.09	.07	.11
Fresh <u>2/</u>	-.04	-.09	-.01	-.16	.05	.07
Processed <u>2/</u>	.16	.18	.06	-.01	.10	.19
Bacon and sausage	.04	-.04	-.02	-.10	.06	.06
Veal	.17	.53	.12	.42	.05	.11
Lamb, mutton, goat	.62***	.70	.51***	.52	.11	.18
Poultry	.15	.17	.07	.08	.12	.09
Chicken	.12	.17	.05	.09	.07	.08
Whole	.04	-.05	-.01	-.07	.05	.02
Parts	.33	.39	.24	.38	.11	.01
Processed	.24	.55	.20	.47	.04	.08
Turkey	.71	.21	.59	.06	.12	.55
Whole	.60	-.15	.56	-.14	.04	-.01
Parts	.85	.39	.65	.24	.20	.15
Other	.18	.43	.52	-.17	.16	.26
Fish and shellfish	.17	.16	-.05	-.04	.23	.20
Fish	.06	.03	.02	-.07	.04	.10
Shellfish	.69	.73	.60	.18	.09	.59
Franks	.04	-.07	.00	-.14	.04	.07
Luncheon meats	-.02	-.12	-.08	-.17	.06	.05
Variety meats	.05	.04	-.05	-.22	.10	.26

*** indicates that the 1965 and 1977 elasticities are statistically different at the 0.01 level.

1/ Elasticities for 1965 were calculated from the parameters of the 1965 equations but were evaluated at 1977 means.

2/ Excluding bacon and sausage.

However, few of the elasticities were found to have changed in a statistically significant manner. In fact, only for total meat, red meat, round and chuck steak and roasts, bacon and sausage, and lunch meats, were the expenditure elasticities found to be statistically different between the surveys. For quantity elasticities only total meat, red meat, round and chuck steaks, chicken parts, and frankfurters had statistically different values. Except for the expenditure elasticity for round and chuck roasts and the quantity elasticity for chicken parts, all the elasticities which were statistically different between the surveys declined in absolute value. These results indicate that the response of consumers to income increases remained relatively unchanged between the surveys, with few exceptions. The quality elasticities were higher in 1977 than in 1965 for a majority of the items. A higher quality elasticity over time indicates that households pay more for the item in question (after adjustment for inflation), presumably in the form of higher quality cuts. The quality elasticities were not tested against each other for statistical significance because of computational difficulties.

Comparison of Regression Coefficients. Statistical tests for equality of expenditure regression coefficients as estimated from the spring 1965 and spring 1977 surveys are presented in table 44. When taken as a group all coefficients (except the constant) estimated from the spring 1965 regressions are statistically different from those for the spring 1977 regressions. However, testing individual sets of coefficients from the two regressions yielded mixed results. For example, the intercepts from the two regressions were statistically different in the case of pork but not for beef; regional expenditure patterns did not change significantly for poultry but did for red meats; expenditures on total meats attributable to race changed between the survey but remained about the same for fish and shellfish. The intercepts measure changes in the average consumption patterns between periods which are not accounted for by changes in the other included variables.

Presented in table 45 are tests for equality of the quantity regression coefficients. These results are similar to those from the test of the expenditure regression coefficients. In the interest of brevity these results will not be discussed at length but are easily interpreted as illustrated above.

Statistical results from this section imply the following. There is a slight tendency toward a decreasing preference over time in demand for at-home meat and related items with respect to income increases. However, in a majority of cases no statistically significant difference in estimated response parameters was found. Households appeared to pay more for a given item, after adjustments for inflation, in 1977 than 1965--this may indicate a demand for higher quality cuts. Changes in the effects of race, family size, regional location of household residence, and so on, on expenditures and quantities consumed were statistically significant for some items but not for others. No general trend concerning changing effects of various socioeconomic characteristics on meat demand are revealed. Products must be examined

on an individual basis to ascertain whether the impacts of any given variable have changed between the surveys. This is easily done by examining tables 44 and 45.

Table 44--Tests for equality of expenditure regression coefficients, Spring 1965 versus Spring 1977

Item	: All coefficients:			Intercepts:			Regional:			Rural:			Race:			Income:			Expenditure:			Family:			Age Comp-		
	: equal	except	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: equal	: position	: equal	: equal		
Total meats	13.079***		5.025**	6.711***	0.023	36.442***	1.133	0.797	1.538	5.405***																	
Red meats	11.117***		5.968**	7.444***	.042	22.691***	.940	.780	.200	4.573***																	
Beef	8.670***		.444	11.283***	.726	15.059***	.315	.058	.101	3.604***																	
Loin and rib																											
Steaks	3.864***		1.240	1.394	1.212	2.568	.111	.156	.024	3.171***																	
Roasts	.759		.468	1.121	.388	.245	.367	.298	.268	.467																	
Round and chuck																											
Steaks	4.181***		.061	2.753**	.799	7.679***	3.026**	5.598**	4.326**	2.558**																	
Roasts	6.283***		1.951	6.666***	4.017**	16.410***	2.985*	1.055	1.896	1.402																	
Ground	4.190***		27.086***	5.439***	24.168***	.117	1.890	.174	.425	1.561																	
Other	.845		5.390**	1.246	.221	1.301	.327	.615	1.121	1.043																	
Pork	4.660***		4.450**	.312	.204	5.615**	.643	1.238	1.217	1.715																	
Fresh 1/	3.341***		.176	2.568*	3.112*	8.539***	.980	1.960	1.147	1.904*																	
Processed 1/	3.989***		6.422**	.796	.101	.034	.395	.014	.552	.636																	
Bacon and sausage	1.211		.097	.081	.566	2.925*	3.000**	1.282	.0001	.896																	
Veal	1.727**		5.803**	2.639**	2.528	12.530***	.307	.584	.157	.158																	
Lamb, mutton, goat	2.620***		5.218**	5.369***	4.117**	.016	3.010**	1.009	.002	.251																	
Poultry	2.880***		.197	.463	1.577	16.496***	.858	.335	.041	.347																	
Chicken	2.217***		3.311*	.231	1.908	15.037***	.768	.567	1.070	.683																	
Whole	1.485		2.041	.324	.063	8.734***	1.444	1.057	.055	.400																	
Parts	2.088***		2.055	1.396	1.220	4.451**	1.328	1.946	8.145***	.762																	
Processed	2.787***		.484	1.658	1.577	.125	3.221**	3.375*	2.775*	5.136***																	
Turkey	2.166***		8.701***	.848	.097	1.576	.227	.139	4.219**	.974																	
Whole	2.285***		.555	.315	.173	.883	1.068	1.572	.135	.826																	
Parts	2.196***		12.185***	3.314**	.0001	.681	1.609	.623	6.714***	2.679**																	
Other	2.062**		.032	2.776**	2.193	.002	.272	.308	1.880	2.281**																	
Fish and shellfish	1.447		.061	.150	.559	.274	.381	.011	2.125	2.241**																	
Fish	1.310		.462	.310	.111	.045	.645	.071	2.210	2.637**																	
Shellfish	1.458		.532	1.094	.949	2.250	.274	.509	.162	.782																	
Franks	1.758**		2.677	1.936	.647	1.527	.923	1.845	1.316	1.691																	
Luncheon meats	4.071***		.399	2.083*	.392	13.355***	2.696*	2.008	4.077**	2.736**																	
Variety meats	3.641***		8.912***	1.431	3.752*	18.378***	.591	.071	3.733*	1.766																	

*, **, and *** --- Indicate that the 1965 and 1977 coefficients were statistically different at the 0.10, 0.05, and 0.01 level, respectively.

1/ Excluding bacon and sausage

Table 45--Tests for equality of quantity regression coefficients, Spring 1965 versus Spring 1977

Item	All coefficients:Intercepts:Regional			Rural			Race			Income			Family			Age comp-		
	: equal	intercept	: equal	: equal	dummies	: equal	: equal	dummies	: equal	: equal	coefficients:	elasticity	: equal	: equal	size	: position	: equal	: equal
Total meats	12.378***	0.098	5.042***	0.275	27.706***	3.801**	4.044**	1.377	4.834***									
Red meats	10.528***	.148	6.853***	.001	14.131***	2.474*	3.229*	.008	4.270***									
Beef	7.650***	.336	10.812***	.076	11.428***	1.711	1.019	.245	2.891**									
Loin and rib																		
Steaks	3.158***	.338	.737	.442	3.843*	.101	.075	.067	1.541									
Roasts	.846	.782	1.291	.097	.409	.569	.752	.001	.637									
Round and chuck																		
Steaks	4.508***	.157	3.811***	1.172	5.397**	3.018**	5.185**	3.561*	3.105***									
Roasts	6.115***	1.026	6.713***	4.203**	13.413***	2.864*	.810	1.440	1.886*									
Ground	2.062**	24.091***	2.897**	10.964***	.124	.737	.459	.233	1.152									
Other	.514	.615	1.112	.069	2.192	.121	.021	.001	.398									
Pork	4.906***	.109	.397	.220	1.383	1.335	2.657	.145	1.662									
Fresh 1/	2.740***	.356	1.309	1.059	7.929***	1.393	2.266	.005	1.919*									
Processed 1/	5.686***	1.857	.224	.746	1.329	.425	.268	.778	.352									
Bacon and sausage	1.060	.235	.339	1.574	.453	2.432*	1.049	.131	1.059									
Veal	2.493***	7.673***	2.738**	2.716*	20.607***	.347	.613	.522	.052									
Lamb, mutton, goat	2.440***	4.759**	4.672***	5.407**	.002	1.832	.954	.032	.377									
Poultry	2.387***	.461	.272	1.138	10.976***	.690	.042	.079	.175									
Chicken	1.496	2.738*	.304	1.618	5.877**	.845	.443	.620	.647									
Whole	.724	1.509	.185	.496	2.913*	.850	.533	.057	.216									
Parts	1.815**	1.492	1.497	.720	2.409	2.179	4.131**	6.486**	.860									
Processed	2.611***	.345	2.515*	.790	.029	1.396	2.329	2.103	3.634***									
Turkey	2.298***	4.316**	.037	.290	7.416***	.421	.791	1.845	.834									
Whole	2.311***	.822	.298	.131	.891	.935	1.510	.386	.733									
Parts	2.229***	7.657***	.837	.220	16.853***	1.486	.208	3.075*	1.944*									
Other	1.217	.270	1.413	1.197	.002	.331	.538	.857	1.638									
Fish and shellfish	2.263***	1.084	.169	.632	.333	2.075	.784	4.231**	4.127***									
Fish	2.127***	.634	.420	.175	.166	1.821	.347	3.948**	4.475***									
Shellfish	2.399***	.887	1.206	1.636	.388	.660	1.128	.404	2.630**									
Franks	1.586*	2.841*	1.696	.143	1.765	1.379	2.730*	.432	1.396									
Luncheon meats	3.697***	.002	1.284	(.0004)	10.756***	2.471*	2.398	3.117*	2.733**									
Variety meats	2.947***	2.848*	.782	1.206	10.533***	.960	1.236	5.332**	1.543									

*, **, and *** --- Indicate that the 1965 and 1977 coefficients were statistically different at the 0.10, 0.05, and 0.01 level, respectively.

1/ Excluding bacon and sausage

CONCLUSIONS

The purpose of this report is to provide information that can be used to answer questions about how much red meat, poultry, and fish consumers would like to purchase when they are faced with changes in economic variables over which they have little, if any, control. The framework for analysis is an extended version of the traditional theory of consumer demand, which is a budget allocation theory that implies interdependence between consumer demand responses for all items in the budget. Along with appropriate statistical techniques, we have applied this framework to meat consumption data and have obtained numerical estimates of response parameters. Results from simulation analyses and various summary statistics lead us to conclude that the parameter estimates provide an adequate reflection of consumer's historical responses to changes in meat prices and income.

Two distinct types of data have been used to obtain estimates of consumers' meat response parameters. The characteristics of these data have placed limitations on the types of analyses that could be performed. In the first part of the report we concentrate on demand studies that consider the full household budget allocation process and analyze meat demand behavior by successive levels of disaggregation - from food at home and food away from home and their relation to other budget items, to beef and veal and chicken. The choice of specific meat items to analyze are largely determined by the availability of data. For the full budget analyses time series data on consumer expenditures, prices, and consumption are used to obtain numerical response measures. The time series data on meat consumption relate to total U.S. meat consumed--both at-home and away-from-home. It is not possible to separate the two quantity components in this set of data. Thus, the analyses relate to the consumption of representative or average consumers and, when coupled with population data, the response measures presented are useful for answering questions about U.S. market demand for meat and meat related commodities.

The second type of data used are cross-section data on *at-home* meat consumption from U.S.D.A. household food consumption surveys. These data extend the usefulness of the analysis in two ways. First, we can examine actual consumption of household units and measure the effect that specific household characteristics have on the consumption of meat items. Second, the survey contains data on a much finer classification of specific meat items, and we are able to identify the responses of households with different characteristics to changes in income for specific meat products and meat cuts. But, we do not have comparable, complementary data on away-from-home meat consumption or, on the consumption of all other items in the budget of the household. Thus, the cross-section analyses are only partial analyses, as opposed to the full budget allocation process described above. The response measures estimated from cross-section data are useful, however, for the information provided about demand for specific meat items, and the demand responses of particular socioeconomic or demographic groups.

The report contains a large number of specific measures of demand responses, estimated from data sources that are not strictly comparable in all cases. To bring the entire contents of the report into focus, the major conclusions in terms of income, price, and socioeconomic and demographic responses for the various meat categories and specific meat items are summarized below.

Income Effects

The distinguishing effect of income on consumption of food commodities is that income changes have less effect on the demand for food, and meat, than for nonfood budget items. The demand for food is income-inelastic, as is the demand for red meat, poultry, and fish. Thus, if consumer incomes increase, the *proportion* of the total budget spent on red meats, poultry, and fish can be expected to decrease. Alternatively, decreases in income or reductions in its rate of growth, will have less relative impact on income-inelastic commodities. Income elasticity estimates obtained from annual time series data indicate that, on a relative basis, the quantity demanded of poultry is more responsive to a change in income than is red meat or fish. Fish was found to be the least responsive to changes in income. In contrast, *quantity*-income elasticity estimates obtained from the 1977-78 NFCS indicate that at-home consumption of red meat or poultry is less responsive to a change in income than fish and shellfish, and poultry is the least responsive. Thus, the estimated income elasticities for the aggregates red meat, poultry, and fish obtained from the two sets of data appear to be contradictory. Since the income response measures obtained for both sets of data were highly significant in a statistical sense, it is worthwhile to explore possible reasons for the apparent differences. One possibility is that the away-from-home market, excluded from the cross-section analysis, is an important component of the demand for these products. Aggregate budget studies, almost without exception, indicate that the demand for food away from home is much more responsive to a change in income than is the demand for food at home. If we attribute the differences in our response measures solely to this difference in data characteristics the implication is that away-from-home consumption of poultry is much more responsive to income changes than is the demand for red meat or fish.

A comparison of the estimated income effects for further disaggregations of meat groups, reveals similar results. The time series results also show that the income elasticities for red meat items and chicken are positive, but inelastic, although some of these estimates are characterized by a low level of precision. While only measuring the at-home income response, the cross-section results show some quantity-income elasticities to be negative. For example, at-home consumption of franks, luncheon meats, and variety meats have rather large negative quantity responses to increases in income. The estimated quantity-income elasticity for at-home pork consumption is also negative.

If these at-home elasticity estimates are to be consistent with the time series estimates, the income elasticity estimates for away-from-home consumption for these meat items must be positive and greater than the time series estimates. Although small, the estimated at-home elasticity for beef is positive. Focusing strictly on at-home poultry consumption, the cross-section analyses provide some interesting results. For example, the estimated income responses provide strong evidence of implied substitution between whole chicken and turkey, and the more processed poultry items. Thus, as income levels increase, consumers switch to the more processed poultry items such as chicken parts, processed chicken, and turkey parts.

Income elasticity estimates from the time series analyses, while inelastic, indicate that canned and cured fish consumption is more responsive to changes in income than is fresh and frozen fish. The cross-section income elasticity estimates show that at-home shellfish consumption is considerably more responsive to a small change in income than is at-home fish consumption.

General conclusions from a review of all income elasticity estimates are that all meat items in the study are income inelastic. That is, a 1-percent increase in consumer income will cause consumers to increase consumption of these items by less than 1 percent. Moreover, at-home meat consumption is considerably more income-inelastic than the combined at-home and away-from home consumption and we have no strong evidence to indicate that at-home income elasticities were different in 1977-78 than in 1965. An additional conclusion, based on the cross-section estimates for meats, is that those items which are more convenient to prepare, or are generally perceived to be of higher quality, are considerably more income responsive than others. This is particularly evident for poultry parts and processed poultry when compared to whole birds, implying that as incomes increase proportionate growth in at-home consumption of these items will be greater.

Price Effects

Several types of price responses are considered in the report--direct and cross-price elasticities estimated for the annual time series data, price flexibilities from monthly demand relationships and *quality* elasticities obtained in from cross-section analyses. Since the assumptions for each of these analyses differ, we briefly summarize the major conclusions for each.

The time series estimates of own-price elasticities indicate that food at home, food away from home, and all meat categories studied are price inelastic. That is, a one percent increase in the price of a specific meat item is associated with a decrease of less than one percent in the consumption of that item. Food at home was found to be much less responsive to an own-price change than was food away from home. In contrast, most nonfood items were own-price elastic. Estimates of own price elasticities for meat items were generally found to be quite reliable in a statistical sense. Own-price elasticity estimates for red meat ranged from $-.66$ for beef and veal to $-.73$ for pork. Own price elasticity

estimates for chicken and turkey were somewhat lower in absolute value at $-.58$ and $-.65$, respectively. The own price elasticity estimates for fish were considerably lower than those for red meats and poultry.

Although many cross-price elasticity estimates were found not to be significant, a number of meat prices were found to have significant impacts on consumption of other meat items, and these responses do not appear to be symmetric. In particular, a change in the price of beef or pork has a greater impact on poultry and fish consumption than vice-versa. Monthly price flexibility estimates indicate that beef, pork, and broilers exhibit strong short term interdependence among prices for marginal changes in a given quantity, while there is little evidence of strong interrelations among other meat items. All own-price flexibilities were estimated to be less than one in absolute value. This reinforces the notion that an increased quantity of one meat item, when all other *quantities* are held constant, requires a change in each of the other significant meat prices, in order for the increased quantity to be removed from the market.

All of the at-home quality elasticity estimates were positive in value. Thus, even though an increase in income may cause the consumer to reduce consumption of a particular meat item, a higher quality-higher priced variant of the same item will be purchased after the increase in income.

Socioeconomic Effects

In general, most of the various socioeconomic and demographic variables analyzed were found to have significant influence on meat consumption, and as the meat categories are broken down into successively finer product classifications, the influence of a particular factor was discernable. General conclusions that can be reached from the cross-section analyses of at-home meat consumption are as follows.

Race is an important factor influencing at-home consumption of many meat items. Blacks tend to consume larger quantities of many meat items than their nonblack counterparts with the same characteristics. The largest influence of race on consumption is for the lower priced cuts of beef, pork, variety meats, poultry, and fish. Consequently, whatever the reasons, blacks exert more influence on the at-home meat market than their share of the population would indicate.

The effect of season on at-home meat consumption confirms the notion that meat items requiring longer cooking times are consumed more heavily during the fall and winter months and that traditional cook-out items are consumed more heavily during the spring and summer.

As a general rule, the demand response of households located in major producing regions tends to be positive and larger than the response of households located in other regions. Thus, households located in the South and Northeast tend to

consume more chicken than households in other regions, and households located in the Midwest and South tend to be larger consumers of pork.

The importance of household composition to at-home meat consumption tends to be fairly uniform for most meat items. Households with higher proportions of adults in the 40-64 age group tend to eat more meat from home supplies than households composed largely of higher or lower age groups.

Demand Structure

Simulations of the various aggregate demand structures estimated from time series data--for food; for meat, poultry and fish; and for the more disaggregated meat and related commodities, in each instance show that over 95 percent of the variation in quantity demanded is explained by the estimated structure. The major part of this explained variation is due to changes in prices and income.

After accounting for other significant socioeconomic and demographic variables which were also analyzed, the alleged importance of other factors on meat demand would appear to be minor. Furthermore, these simulation results along with the absence of any strong evidence of changes in income elasticities for at-home meat consumption elasticities between 1965 and 1977-78, provide substantial indirect evidence of a large degree of inherent stability in the demand structure for meat.

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APPENDIX
Explanatory Notes

NOTES

- (1) The elasticity estimates in table 5 are based upon parameter estimates from a demand model called the Linear Expenditure System (LES). This model was developed by Stone (7), and is widely discussed in demand literature.

In order to be analyzed within the context of the LES, all goods must be substitutes and none can be inferior goods. Another property is that the income effects of price changes dominate the substitution effects. It is for this reason that all of the algebraic signs on the cross price elasticities are negative. For more details concerning the strengths and weaknesses of the LES, see (2).

Data used to obtain the parameter estimates are U.S. Department of Commerce personal consumption expenditures, their related implicit prices deflators, and 50-state resident population. These data are available in (11) and (12).

The expenditure equations which reflect the model are of the form:

$$p_i q_i = p_i \gamma_i + \beta_i \left[m - \sum_{j=1}^n p_j \gamma_j \right] \quad i = 1, 2, \dots, n; \quad (1.1)$$

where p is price, q is quantity, m is total expenditure, and n is the number of goods in the budget. The expenditure on a good ($p_i q_i$) is assumed to consist of two components. The first component ($p_i \gamma_i$) represents an amount that will be spent on good i regardless of the price of good i . For this reason the parameter γ_i is called a minimum requirement. The second component consists of a proportion of income that remains after the expenditure on all minimum requirements are taken into account. The parameter β_i is called a marginal budget share since it represents the proportion of an additional dollar in income that will be spent on good i .

Parameter estimates, their associated standard errors, and R^2 values for the eleven expenditure equations are contained in appendix table 1.

- (2) The error statistic used to measure forecasting efficiency is calculated as the ratio of the root mean-square-error to the sample mean and multiplied by 100:

$$\left\{ \left[\left(\frac{1}{T} \right) \sum_{t=1}^T (y_t - \tilde{y}_t)^2 \right]^{1/2} / \bar{y} \right\} \times 100, \quad (2.1)$$

where y_t is the actual value of the dependent variable; \tilde{y} and \bar{y} are the predicted value and sample mean of y_t , respectively, and T is the total number of observations.

- (3) The following is a brief sketch of the model, estimation procedure and data sources for the composite and disaggregate demand systems underlying the estimates contained in tables 6 and 7.

Appendix table 1--Linear expenditure system, Parameter estimates for the aggregate demand model.^{1/}

Expenditure Equation	β_1	γ_1	R^2
Food at home	0.0507 (.004)	419.97 (5.01)	0.99
Food away from home	.0361 (.001)	115.09 (1.88)	.99
Alcohol and tobacco	.0217 (.001)	144.06 (1.39)	.99
Clothing	.0750 (.001)	245.29 (2.92)	.99
Housing	.2145 (.004)	314.97 (6.64)	.99
Utilities	.0349 (.001)	84.08 (1.08)	.99
Transportation	.1095 (.002)	186.67 (3.31)	.99
Medical	.1434 (.004)	162.61 (6.30)	.99
Durable goods	.1535 (.009)	277.74 (11.53)	.98
Nondurable goods	.0444 (.003)	127.00 (3.80)	.99
Services	.1161 (.002)	303.39 (4.28)	.99

^{1/} Numbers in parentheses are standard errors of the associated parameter estimates.

From classical demand theory, a set of demand equations for n commodities is obtained:

$$q_i = f(p_1, p_2, \dots, p_n, m) \quad i = 1, 2, \dots, n; \quad (3.1)$$

where p is price, q is quantity, and m is total expenditure. Since the functional form depends on the utility function, which is in general unknown, we first approximate the demand equation using the total differential of each equation;

$$dq_i = \sum_{j=1}^n \frac{\partial q_i}{\partial p_j} dp_j + \frac{\partial q_i}{\partial m} dm \quad i = 1, 2, \dots, n; \quad (3.2)$$

where n is the number of goods in the budget.

Replacing partial derivatives by elasticities gives:

$$dq_i/q_i = \sum_{j=1}^n \epsilon_{ij}(dp_j/p_j) + \epsilon_{i0}(dm/m) \quad i = 1, 2, \dots, n; \quad (3.3)$$

where the parameters ϵ_{ij} are own-price and cross-price elasticities and ϵ_{i0} is the income elasticity.

Equation set (3.3) represents the theoretical model underlying the composite and disaggregate demand systems. However, since data observations are not available for dq_i/q_i , dp_i/p_i , and dm/m , we use relative changes of quantity, price, and total expenditure as data observations in the statistical model.

Classical demand theory provides some prior constraints on the parameters of the system--these are Engel aggregation, homogeneity, and symmetry (see 2, p.43). Thus, constrained maximum likelihood procedures, incorporating the restrictions, were used to estimate the demand parameters.

Data needed to estimate the demand systems include observations on quantities, prices, total expenditures, and average budget shares. Quantity data for both models are based on per capita consumption data contained in (9) and (10). For the disaggregate demand system these data are transformed into quantity relatives using 1967 as a base year. For the composite demand system, quantity indices are calculated using a Laspeyres formula and price weights averaged over the 1967-69 period. The quantity index for the nonfood sector was calculated by dividing nonfood per capita expenditures measured in current dollars by the consumer price index of all items less food.

Price data for the disaggregate and composite demand systems are BLS consumer price indices. These price indices can be obtained from (15) and (16).

Total expenditure is calculated as total personal consumption expenditures (12) divided by 50-state civilian population as of July 1 of each year (11).

Expenditure weights were obtained by calculating the proportion of the total food value-aggregate spent on each food item and multiplying these proportions by the average budget share for food. Value aggregates for food are contained in (9) and (10). Average budget shares for food and nonfood were calculated from personal consumption expenditure data obtained from (12).

- (4) The model, estimation procedures, and data sources for the monthly meat demand relationships are as follows.

An alternative derivation of the consumers budget allocation process was used to obtain a general demand system in which nominal prices (p_i/m) are functions of quantities demanded.

$$(p_i/m) = g(q_1, q_2, \dots, q_n) \quad i = 1, 2, \dots, n \quad (4.1)$$

These equations represent a price dependent demand system. For convenience in interpreting the parameters, and further specifying an autocorrelated error structure, a log linear approximation was selected for the statistical model:

$$\log(p_{it}/m_t) = \alpha_{i0} + \sum_{j=1}^n \alpha_{ij} \log q_{jt} + \sum_{k=1}^m \beta_{ik} d_{kt} + v_{it} ; \quad (4.2)$$

$$v_{it} = \sum_{j=1}^3 \delta_{ij} v_{i,t-j} + \mu_{it} ; \quad i = 1, 2, \dots, n ;$$

and $m = 11$.

For a specific month t , the p_{it} are prices, m_t is total expenditure), the q_{it} are quantities, the d_{kt} are monthly (dummy) variables assigned a value of one for the month to which the data observations relate and a value of zero otherwise. The v_{it} are disturbance terms postulated to have an autocorrelated structure lagged up to 3 months. The μ_{it} are random components of the autocorrelated error structure. An iterative procedure was used to

estimate the mixed structure-time-series demand system represented by (4.2). The estimated model reflects the period January 1964 through December 1979.

Monthly price data were obtained from (14), for all items except broilers. Broiler prices and all quantity data were unpublished data maintained by the Economic Research Service of the USDA.

Total expenditure data were obtained from the U.S. Department of Commerce, Bureau of Economic Analysis. In addition, the other goods category is represented by per capita nonfood expenditures measured in constant (1967) prices. Ideally, this item should include nonfoods and foods other than meats, but the exclusion of the latter is due to the lack of monthly data for nonfoods other than meats.

- (5) The mathematical form of the regression models used for each meat item (i) and household (j) are written for money value, E_{ij} , and quantities Q_{ij} , as

$$E_{ij} = \alpha_{0i} + \alpha_{1i}X_{1j} + \alpha_{2i}X_{2j} + \dots + \alpha_{18i}X_{18j} + \mu_{ij}, \text{ and} \quad (5.1)$$

$$Q_{ij} = \beta_{0i} + \beta_{1i}X_{1j} + \beta_{2i}X_{2j} + \dots + \beta_{18i}X_{18j} + v_{ij} \quad (5.2)$$

The X's are explanatory variables, while the α 's and β 's are unknown response parameters. The v_{ij} and μ_{ij} are random error components. The definitions of the variables in (5.1) and (5.2) are as follows. E_{ij} and Q_{ij} are per person weekly money values and quantities per person for the ith commodity by the jth household, respectively; X_{1j} , X_{2j} and X_{3j} are dummy variables for residential location in the North Central, Southern, and Western regions of the United States, respectively; X_{4j} and X_{5j} are dummy variables for residential location in suburban-SMSA and non-SMSA areas; X_{6j} is a dummy variable for race of household head; X_{7j} and X_{8j} are per capita disposable income and income squared respectively; X_{9j} , X_{10j} , and X_{11j} are dummy variables for the Summer, Fall, and Winter seasons respectively; X_{12j} is the inverse of household size; X_{13j} is the number of guests meals per household member; and X_{14j} , X_{15j} , X_{16j} , X_{17j} and X_{18j} are the proportion of the household in age groups 1-2, 3-12, 13-19, 20-39, and 65 and over, respectively.

The money value elasticity (ξ_{ij}), and the quantity elasticity (η_{ij}) for item i and household j are represented by equations (5.3) and (5.4), respectively. Note that both elasticities are a function of income levels.

$$\xi_{ij} = [\alpha_{7i} + 2\alpha_{8i}X_{7j}] \times \frac{X_{7j}}{E_{1j}} \quad (5.3)$$

$$\eta_{ij} = [\beta_{7i} + 2\beta_{8i}X_{7j}] \times \frac{X_{7j}}{Q_{1j}} \quad (5.4)$$

The quality elasticity measures the extent to which the average item price varies with consumer income. It is computed as the difference between the estimated money value and quantity elasticities.

Appendix table 2--Percentage of home meat consumption that was home produced, By urbanization, Spring 1977

Item	Urbanization		
	Central city	Suburban	Nonmetropolitan
	Percent		
Total meats	1.01	3.00	11.43
Red meats	.13	2.33	11.18
Beef	.15	3.05	14.06
Loin and rib			
Steaks	<u>2/</u>	3.86	18.33
Roasts	<u>2/</u>	7.78	32.21
Round and chuck			
Steaks	<u>2/</u>	3.14	14.27
Roasts	<u>.36</u>	3.56	11.90
Ground	.20	2.19	13.03
Other	<u>2/</u>	2.07	12.17
Pork	.10	1.08	5.73
Fresh <u>1/</u>	.05	.27	7.63
Processed <u>1/</u>	<u>2/</u>	1.78	3.45
Bacon and sausage	<u>.26</u>	1.48	5.68
Veal	<u>2/</u>	<u>2/</u>	<u>2/</u>
Lamb, mutton, goat	<u>2/</u>	<u>2/</u>	11.49
Poultry	<u>2/</u>	.88	4.34
Chicken	<u>2/</u>	.87	4.02
Whole	<u>2/</u>	1.43	5.32
Parts	<u>2/</u>	<u>2/</u>	<u>2/</u>
Processed	<u>2/</u>	<u>2/</u>	<u>2/</u>
Turkey	<u>2/</u>	<u>2/</u>	<u>2/</u>
Whole	<u>2/</u>	<u>2/</u>	12.16
Parts	<u>2/</u>	2.09	<u>2/</u>
Other	<u>2/</u>	<u>2/</u>	<u>2/</u>
Fish and shellfish	9.99	18.33	37.03
Fish	11.28	20.23	42.16
Shellfish	.04	3.43	<u>2/</u>
Miscellaneous			
Franks	<u>2/</u>	<u>2/</u>	.35
Luncheon meats	<u>2/</u>	.04	.90
Variety meats	.28	3.72	14.06

1/ Excluding bacon and sausage

2/ Less than .005

Appendix table 3--1977-78 Nationwide Food Consumption survey: Meat consumption regression equations 1/

Item	Total Meats		Red Meats		Beef	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	5.0995*** (0.1630)	6.0228*** (0.2048)	3.1234*** (0.1093)	4.0023*** (0.1556)	1.9339*** (0.0824)	2.3950*** (0.1147)
Northcentral	-0.2121** (0.0834)	-1.0509*** (0.1048)	0.1168** (0.0559)	-0.5061*** (0.0796)	0.1486*** (0.0422)	-0.2711*** (0.0587)
South	-0.0513 (0.0795)	-0.8151*** (0.0999)	-0.0092 (0.0533)	-0.4041*** (0.0759)	-0.0344 (0.0402)	-0.2316*** (0.0559)
West	-0.4758*** (0.0911)	-0.9956*** (0.1145)	-0.1342** (0.0611)	-0.5758*** (0.0870)	0.0276 (0.0461)	-0.2201*** (0.0641)
Suburban	-0.3263*** (0.0753)	-0.4069*** (0.0947)	-0.0699 (0.0505)	-0.1388* (0.0719)	-0.0653* (0.0381)	-0.0888* (0.0530)
Nonmetropolitan	-0.4428*** (0.0768)	-0.8392*** (0.0964)	-0.0712 (0.0515)	-0.3781*** (0.0733)	-0.0472 (0.0388)	-0.2390*** (0.0540)
Black	1.8213*** (0.0969)	1.5260*** (0.1217)	0.5565*** (0.0650)	0.6151*** (0.0925)	0.1966*** (0.0490)	0.1957*** (0.0682)
Income <u>2/</u>	0.0618 (0.1931)	1.7267*** (0.2426)	0.3453*** (0.1295)	1.4147*** (0.1844)	0.3938*** (0.0976)	1.1447*** (0.1359)
Income squared <u>3/</u>	-0.4580 (0.8303)	-3.3314*** (1.0433)	-1.2179** (0.5570)	-3.1223*** (0.7928)	-1.2205*** (0.4199)	-2.5854*** (0.5842)
Summer quarter	0.0386 (0.0844)	0.0969 (0.1061)	-0.0356 (0.0566)	0.0010 (0.0806)	0.0440 (0.0427)	0.0497 (0.0594)
Fall quarter	-0.0167 (0.0815)	-0.0335 (0.1024)	-0.1297** (0.0547)	-0.0876 (0.0778)	-0.0493 (0.0412)	-0.0421 (0.0573)
Winter quarter	-0.0551 (0.0823)	0.1581 (0.1034)	-0.0647 (0.0552)	0.1055 (0.0786)	-0.0285 (0.0416)	0.0588 (0.0579)
Household size (Inverse)	0.4376*** (0.1505)	0.5084*** (0.1891)	-0.1891* (0.1010)	-0.0757 (0.1437)	-0.0958 (0.0761)	0.0375 (0.1059)
Guest meals	0.8792*** (0.0281)	1.0439*** (0.0353)	0.4800*** (0.0188)	0.6598*** (0.0268)	0.2670*** (0.0142)	0.3634*** (0.0198)
% Age 0-2	-3.1051*** (0.3286)	-3.7891*** (0.4129)	-2.1353*** (0.2204)	-2.7160*** (0.3137)	-1.3084*** (0.1662)	-1.6327*** (0.2312)
% Age 3-12	-1.9060*** (0.1935)	-2.1230*** (0.2431)	-1.3170*** (0.1298)	-1.5294*** (0.1848)	-0.8481*** (0.0978)	-0.9914*** (0.1361)
% Age 13-19	-1.2792*** (0.2053)	-1.3424*** (0.2579)	-0.8633*** (0.1377)	-1.0146*** (0.1960)	-0.4815*** (0.1038)	-0.5632*** (0.1444)
% Age 20-39	-1.0343*** (0.1063)	-1.0000*** (0.1336)	-0.5907*** (0.0713)	-0.7633*** (0.1015)	-0.3610*** (0.0537)	-0.5026*** (0.0748)
% Age 65 & over	-0.9684*** (0.1069)	-1.1113*** (0.1344)	-0.6195*** (0.0717)	-0.8085*** (0.1021)	-0.4821*** (0.0541)	-0.6351*** (0.0752)
Summary statistics: <u>4/</u>						
R ²	0.192	0.192	0.121	0.137	0.083	0.100
F-Urbanization	17.565***	38.045***	1.229	13.928***	1.519	10.229***
F-Region	10.796***	42.443***	5.593***	19.882***	7.626***	8.775***
F-Season	0.442	1.512	2.038	2.158*	1.874	1.376
F-Age Structure	53.994***	41.965***	49.877***	38.673***	37.280***	31.562***
F-Income	0.021	72.155***	6.796***	78.687***	17.447***	93.742***

See footnotes at end of table.

continued--

Appendix table 3--1977-78 Nationwide Food Consumption Survey: Meat consumption regression equations 1/--continued

Item	Steaks (loin and rib)		Roasts (loin and rib)		Steaks (round and chuck)	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.2353*** (0.0358)	0.3348*** (0.0670)	0.0380*** (0.0132)	0.0622*** (0.0215)	0.3752*** (0.0338)	0.4896*** (0.0492)
Northcentral	-0.0123 (0.0183)	-0.0981*** (0.0343)	-0.0099 (0.0067)	-0.0213* (0.0110)	-0.0673*** (0.0173)	-0.1506*** (0.0252)
South	0.0092 (0.0174)	0.0044 (0.0327)	0.0015 (0.0064)	-0.0062 (0.0105)	-0.0809*** (0.0165)	-0.1244*** (0.0240)
West	-0.0213 (0.0200)	-0.0483 (0.0374)	0.0130* (0.0074)	0.0121 (0.0120)	-0.0428** (0.0189)	-0.0702** (0.0275)
Suburban	-0.0127 (0.0165)	-0.0136 (0.0310)	0.0010 (0.0061)	0.0029 (0.0099)	-0.0408*** (0.0156)	-0.0563** (0.0227)
Nonmetropolitan	-0.0443*** (0.0168)	-0.1265*** (0.0315)	-0.0154** (0.0062)	-0.0271*** (0.0101)	-0.0212 (0.0159)	-0.0418* (0.0232)
Black	0.0300 (0.0213)	0.0078 (0.0398)	-0.0031 (0.0078)	-0.0051 (0.0128)	0.0363* (0.0201)	0.0353 (0.0292)
Income <u>2/</u>	0.4312*** (0.0424)	0.8922*** (0.0793)	0.0261* (0.0156)	0.0458* (0.0255)	-0.0402 (0.0401)	-0.0513 (0.0583)
Income squared <u>3/</u>	-0.8517*** (0.1822)	-1.5808*** (0.3411)	-0.0152 (0.0670)	0.0328 (0.1095)	-0.0369 (0.1724)	0.0149 (0.2506)
Summer quarter	-0.0089 (0.0185)	-0.0160 (0.0347)	0.0012 (0.0068)	0.0011 (0.0111)	0.0365** (0.0175)	0.0521** (0.0255)
Fall quarter	-0.0556*** (0.0179)	-0.0844** (0.0335)	0.0056 (0.0066)	0.0143 (0.0107)	-0.0149 (0.0169)	0.0036 (0.0246)
Winter quarter	-0.0409** (0.0181)	-0.0514 (0.0338)	-0.0043 (0.0066)	-0.0020 (0.0108)	-0.0046 (0.0171)	0.0239 (0.0248)
Household size (Inverse)	-0.0451 (0.0330)	0.0203 (0.0618)	-0.0290** (0.0122)	-0.0515*** (0.0198)	0.0400 (0.0313)	0.0916** (0.0454)
Guest meals	0.0627*** (0.0062)	0.1170*** (0.0115)	0.0137*** (0.0023)	0.0228*** (0.0037)	0.0357*** (0.0058)	0.0522*** (0.0085)
% Age 0-2	-0.1948*** (0.0721)	-0.2587* (0.1350)	-0.0368 (0.0265)	-0.0641 (0.0433)	-0.1759*** (0.0682)	-0.2453** (0.0992)
% Age 3-12	-0.1488*** (0.0425)	-0.1729** (0.0795)	-0.0354** (0.0156)	-0.0532** (0.0255)	-0.1154*** (0.0402)	-0.1384** (0.0584)
% Age 13-19	-0.1109** (0.0450)	-0.1071 (0.0843)	-0.0189 (0.0166)	-0.0364 (0.0271)	-0.0254 (0.0426)	-0.0110 (0.0619)
% Age 20-39	-0.0502** (0.0233)	-0.0995** (0.0437)	-0.0163* (0.0086)	-0.0281** (0.0140)	-0.0369* (0.0221)	-0.0328 (0.0321)
% Age 65 & over	-0.1400*** (0.0235)	-0.2428*** (0.0439)	0.0004 (0.0086)	0.0056 (0.0141)	-0.1055*** (0.0222)	-0.1429*** (0.0323)
Summary statistics: <u>4/</u>						
R ²	0.058	0.068	0.011	0.013	0.014	.015
F-Urbanization	3.808**	10.343***	4.814***	5.878***	3.412**	3.203**
F-Region	1.004	4.143***	3.235**	2.690**	8.804***	14.023***
F-Season	4.285***	2.540*	0.809	1.001	3.365**	1.799
F-Age Structure	8.621***	6.780***	2.515**	2.808**	6.583***	5.827***
F-Income	145.956***	186.691***	5.319**	7.773***	2.501	1.550

See footnotes at end of table.

Appendix table 3--1977-78 Nationwide Food Consumption Survey: Meat consumption regression equations 1/--continued

Item	Roasts (round and chuck)		Beef, Ground		Beef, Other	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.544 7*** (0.0444)	0.66 74*** (0.05 71)	0.54 73*** (0.03 67)	0.6123*** (0.03 78)	0.1935*** (0.0234)	0.228 7*** (0.02 74)
Northcentral	0.1284*** (0.022 7)	0.0458 (0.0292)	0.1491*** (0.0188)	0.0308 (0.0193)	-0.0393*** (0.0120)	-0.0776*** (0.0140)
South	0.0754*** (0.021 7)	0.0336 (0.02 79)	0.0239 (0.01 79)	-0.0462** (0.0184)	-0.0636*** (0.0114)	-0.0928*** (0.0134)
West	0.0180 (0.0248)	-0.0411 (0.0319)	0.0742*** (0.0205)	-0.0262 (0.0211)	-0.0134 (0.0131)	-0.0465*** (0.0153)
Suburban	0.004 7 (0.0205)	0.01 77 (0.0264)	0.0035 (0.01 70)	-0.0182 (0.01 75)	-0.0210* (0.0108)	-0.0213* (0.012 7)
Nonmetropolitan	0.0089 (0.0209)	-0.0140 (0.0269)	0.0435** (0.01 73)	0.0066 (0.01 78)	-0.0187* (0.0110)	-0.0361*** (0.0129)
Black	0.0453* (0.0264)	0.0750* (0.0340)	-0.0183 (0.0218)	-0.0201 (0.0224)	0.1064*** (0.0139)	0.1028*** (0.0163)
Income <u>2/</u>	0.1600*** (0.0526)	0.3142*** (0.06 77)	-0.1418*** (0.0434)	-0.0624 (0.044 7)	-0.0415 (0.02 77)	0.0061 (0.0325)
Income squared <u>3/</u>	-0.5069** (0.2264)	-0.9722*** (0.2911)	0.1599 (0.1868)	-0.0011 (0.1923)	0.0303 (0.1191)	-0.0789 (0.139 7)
Summer quarter	-0.0242 (0.0230)	-0.025 7 (0.0296)	0.0438** (0.0190)	0.0410** (0.0196)	-0.0044 (0.0121)	-0.0029 (0.0142)
Fall quarter	0.0081 (0.0222)	0.0181 (0.0286)	-0.0013 (0.0183)	-0.0064 (0.0189)	0.0089 (0.011 7)	0.0128 (0.013 7)
Winter quarter	-0.022 7 (0.0224)	0.00 78 (0.0288)	0.01 75 (0.0185)	0.0368* (0.0191)	0.0265** (0.0118)	0.043 7*** (0.0138)
Household size (Inverse)	-0.2077*** (0.0410)	-0.2352*** (0.0528)	0.112 7*** (0.0339)	0.1091*** (0.0349)	0.0334 (0.0216)	0.0283 (0.0253)
Guest meals	0.0846*** (0.00 77)	0.1012*** (0.0099)	0.0650*** (0.0063)	0.0621*** (0.0065)	0.0053 (0.0040)	0.0083* (0.004 7)
% Age 0-2	-0.5123*** (0.0896)	-0.6286*** (0.1152)	-0.2882*** (0.0739)	-0.3362*** (0.0761)	-0.1004** (0.04 71)	-0.0998* (0.0553)
% Age 3-12	-0.3830*** (0.0528)	-0.4410*** (0.06 78)	-0.0802* (0.0435)	-0.1050** (0.0448)	-0.0852*** (0.02 78)	-0.0808** (0.0326)
% Age 13-19	-0.3309*** (0.0560)	-0.3896*** (0.0720)	0.0734 (0.0462)	0.0314 (0.04 75)	-0.0688** (0.0294)	-0.0504 (0.0345)
% Age 20-39	-0.2679*** (0.0290)	-0.334 7*** (0.03 73)	0.0621*** (0.0239)	0.0362 (0.0246)	-0.0519*** (0.0152)	-0.0438** (0.01 79)
% Age 65 & over	-0.1103*** (0.0292)	-0.152 7*** (0.03 75)	-0.1160*** (0.0241)	-0.0932*** (0.0248)	-0.0107 (0.0153)	-0.0092 (0.0180)
Summary statistics: <u>4/</u>						
R ²	0.045	0.041	0.032	0.022	0.019	0.018
F-Urbanization	0.091	0.803	4.198**	1.195	2.171	3.915**
F-Region	12.408***	2.861**	25.373***	6.482***	11.543***	17.813***
F-Season	1.072	0.830	2.506*	3.361**	2.68 7**	4.798***
F-Age Structure	33.672***	29.926***	13.328***	9.077***	5.428***	3.260***
F-Income	9.725***	23.139***	18.058***	4.12 7**	4.116**	0.003

See footnotes at end of table.

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Appendix table 3--1977-78 Nationwide Food Consumption Survey: Meat consumption regression equations 1/--continued

Item	Veal		Lamb, mutton, goat		Pork	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.0682*** (0.0120)	0.1536*** (0.0217)	0.0526*** (0.0134)	0.0788*** (0.0229)	1.0687*** (0.0602)	1.3749*** (0.0849)
Northcentral	-0.0446*** (0.0061)	-0.1074*** (0.0111)	-0.0519*** (0.0069)	-0.0883*** (0.0117)	0.0648** (0.0308)	-0.0393 (0.0434)
South	-0.0317*** (0.0058)	-0.0896*** (0.0106)	-0.0585*** (0.0066)	0.1038 (0.0112)	0.1154*** (0.0293)	0.0210 (0.0414)
West	-0.0380*** (0.0067)	-0.0975*** (0.0121)	-0.0058 (0.0075)	-0.0214* (0.0128)	-0.1179*** (0.0336)	-0.2367*** (0.0475)
Suburban	-0.0156*** (0.0055)	-0.0344*** (0.0100)	-0.0098 (0.0062)	-0.0184* (0.0106)	0.0209 (0.0278)	0.0027 (0.0393)
Nonmetropolitan	-0.0285*** (0.0056)	-0.0574*** (0.0102)	-0.0114* (0.0063)	-0.0184* (0.0108)	0.0159 (0.0283)	-0.0633 (0.0400)
Black	0.0438*** (0.0071)	0.0469*** (0.0129)	0.0229*** (0.0080)	0.0386*** (0.0136)	0.2931*** (0.0358)	0.3338*** (0.0505)
Income <u>2</u> /	0.0445*** (0.0142)	0.1024*** (0.0257)	0.0565*** (0.0159)	0.1224*** (0.0272)	-0.1495** (0.0713)	0.0453 (0.1006)
Income squared <u>3</u> /	-0.1196** (0.0610)	-0.2906*** (0.1106)	-0.1046 (0.0685)	-0.2321** (0.1168)	0.2268 (0.3065)	-0.0142 (0.4326)
Summer quarter	-0.0038 (0.0062)	-0.0085 (0.0112)	0.0002 (0.0070)	-0.0005 (0.0119)	-0.0760** (0.0312)	-0.0397 (0.0440)
Fall quarter	-0.0010 (0.0060)	0.0073 (0.0108)	-0.0012 (0.0067)	-0.0056 (0.0115)	-0.0782*** (0.0301)	-0.0472 (0.0425)
Winter quarter	0.0035 (0.0060)	0.0097 (0.0110)	-0.0087 (0.0068)	-0.0141 (0.0116)	-0.0310 (0.0304)	0.0512 (0.0429)
Household size (Inverse)	-0.0032 (0.0111)	-0.0215 (0.0200)	-0.0011 (0.0124)	0.0097 (0.0212)	-0.0891 (0.0556)	-0.0265 (0.0784)
Guest meals	0.0007 (0.0021)	-0.0002 (0.0037)	0.0035 (0.0023)	0.0057 (0.0040)	0.2087*** (0.0104)	0.2909*** (0.0146)
% Age 0-2	-0.0445* (0.0241)	-0.1018** (0.0438)	-0.0244 (0.0271)	-0.0272 (0.0462)	-0.7579*** (0.1213)	-0.9543*** (0.1712)
% Age 3-12	-0.0252* (0.0142)	-0.0474* (0.0258)	-0.0037 (0.0160)	0.0028 (0.0272)	-0.4399*** (0.0714)	-0.4934* (0.1008)
% Age 13-19	-0.0226 (0.0151)	-0.0574** (0.0273)	-0.0148 (0.0169)	-0.0252 (0.0289)	-0.3443*** (0.0758)	-0.3688* (0.1070)
% Age 20-39	-0.0179** (0.0078)	-0.0297** (0.0142)	-0.0143 (0.0088)	-0.0246* (0.0150)	-0.1975*** (0.0392)	-0.2064*** (0.0554)
% Age 65 & over	0.0165** (0.0075)	0.0251* (0.0142)	0.0277*** (0.0088)	0.0379*** (0.0150)	-0.1816*** (0.0395)	-0.2364*** (0.0557)
Summary statistics: <u>4</u> /						
R ²	0.024	0.028	0.023	0.024	0.074	0.066
F-Urbanization	12.772***	15.823***	1.858	1.903	0.297	1.901
F-Region	20.627***	39.685***	37.631***	36.650***	17.825***	11.523***
F-Season	0.494	1.100	0.805	0.645	3.068**	2.303*
F-Age Structure	5.713***	5.431***	5.016***	3.592***	18.596***	12.773***
F-Income	11.744***	18.180***	18.288***	29.108***	6.868***	0.403

See footnotes at end of table.

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Appendix table 3--1977-78 Nationwide Food Consumption Survey: Meat consumption regression equations 1/--continued

Item	Pork, Fresh		Pork, Processed		Bacon and Sausage	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variable:						
Intercept	0.5082*** (0.0368)	0.6567*** (0.0513)	0.3153*** (0.0339)	0.4220*** (0.0497)	0.2453*** (0.0256)	0.2962*** (0.0348)
Northcentral	-0.0355* (0.0188)	-0.0996*** (0.0263)	0.0149 (0.0173)	-0.0315 (0.0254)	0.0854*** (0.0131)	0.0918*** (0.0178)
South	-0.0763*** (0.0180)	-0.1311*** (0.0250)	0.0180 (0.0165)	-0.0287 (0.0242)	0.1737*** (0.0125)	0.1808*** (0.0170)
West	-0.1083*** (0.0206)	-0.1448*** (0.0287)	-0.0717*** (0.0189)	-0.1573*** (0.0278)	0.0620*** (0.0143)	0.0654*** (0.0194)
Suburban	-0.0082 (0.0170)	-0.0225 (0.0237)	0.0126 (0.0157)	0.0070 (0.0230)	0.0164 (0.0118)	0.0183 (0.0161)
Nonmetropolitan	-0.0347** (0.0173)	-0.0733*** (0.0242)	-0.0056 (0.0159)	-0.0408* (0.0234)	0.0562*** (0.0121)	0.0508*** (0.0164)
Black	0.1588*** (0.0219)	0.2020*** (0.0305)	0.0046 (0.0201)	-0.0360 (0.0295)	0.1296*** (0.0152)	0.1679*** (0.0207)
Income <u>2/</u>	-0.1620*** (0.0436)	-0.1724*** (0.0608)	0.1015** (0.0401)	0.2819*** (0.0588)	-0.0890*** (0.0303)	-0.0643 (0.0412)
Income squared <u>3/</u>	0.4375** (0.1876)	0.4818* (0.2615)	-0.3044* (0.1725)	-0.5545** (0.2530)	0.0938 (0.1305)	0.0584 (0.1772)
Summer quarter	-0.0006 (0.0191)	0.0177 (0.0266)	-0.0797*** (0.0175)	-0.0789*** (0.0257)	0.0043 (0.0133)	0.0215 (0.0180)
Fall quarter	0.0077 (0.0184)	0.0293 (0.0257)	-0.0976*** (0.0169)	-0.1051*** (0.0248)	0.0116 (0.0128)	0.0287* (0.0174)
Winter quarter	0.0174 (0.0186)	0.0641** (0.0259)	-0.0568*** (0.0171)	-0.0469* (0.0251)	0.0085 (0.0129)	0.0340* (0.0176)
Household size (Inverse)	-0.0504 (0.0340)	-0.0222 (0.0474)	-0.0929*** (0.0313)	-0.1001** (0.0459)	0.0543** (0.0237)	0.0958*** (0.0321)
Guest meals	0.0775*** (0.0063)	0.1144*** (0.0088)	0.0798*** (0.0058)	0.1058*** (0.0086)	0.0514*** (0.0044)	0.0707*** (0.0060)
■ Age 0-2	-0.2710*** (0.0742)	-0.3317*** (0.1035)	-0.2014*** (0.0683)	-0.2727*** (0.1001)	-0.2854*** (0.0516)	-0.3499*** (0.0701)
■ Age 3-12	-0.1078** (0.0437)	-0.1178* (0.0609)	-0.1446*** (0.0402)	-0.1548*** (0.0589)	-0.1875*** (0.0304)	-0.2208*** (0.0413)
■ Age 13-19	-0.1336*** (0.0464)	-0.1565** (0.0646)	-0.1155*** (0.0426)	-0.0957 (0.0625)	-0.0952*** (0.0323)	-0.1166*** (0.0438)
■ Age 20-39	-0.0681*** (0.0240)	-0.0818** (0.0335)	-0.0546*** (0.0221)	-0.0345 (0.0324)	-0.0747*** (0.0167)	-0.0902*** (0.0227)
■ Age 65 & over	-0.1442*** (0.0242)	-0.2051*** (0.0337)	0.0010 (0.0222)	0.0180 (0.0326)	-0.0385** (0.0168)	-0.0493** (0.0228)
Summary statistics: <u>4/</u>						
R ²	0.034	0.036	0.036	0.037	0.078	0.062
F-Urbanization	2.290	4.979***	0.783	2.690*	11.872***	5.044***
F-Region	11.429***	12.184***	9.028***	11.763***	66.103***	38.743***
F-Season	0.411	2.198*	12.239***	6.563***	0.308	1.428
F-Age Structure	9.115***	8.702***	6.145***	3.490***	16.855***	13.099***
F-Income	16.382***	9.318***	7.049***	32.451***	14.795***	4.314**

See footnotes at end of table.

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Appendix table 3--1977-78 Nationwide Food Consumption Survey: Meat consumption regression equations 1/--continued

Item	Poultry		Chicken		Chicken, Whole	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variable:						
Intercept	1.0099*** (0.0690)	0.7104*** (0.0549)	0.8758*** (0.0563)	0.5970*** (0.0442)	0.6980*** (0.0519)	0.4436*** (0.0338)
Northcentral	-0.2815*** (0.0353)	-0.2954*** (0.0281)	-0.2429*** (0.0288)	-0.2535*** (0.0226)	-0.0506* (0.0266)	-0.0665*** (0.0173)
South	-0.0801** (0.0337)	-0.1950*** (0.0268)	-0.0511* (0.0275)	-0.1571*** (0.0216)	0.1105*** (0.0253)	0.0106 (0.0165)
West	-0.2444*** (0.0386)	-0.2111*** (0.0307)	-0.2157*** (0.0315)	-0.1741*** (0.0247)	-0.0310 (0.0290)	-0.0204 (0.0189)
Suburban	-0.1466*** (0.0319)	-0.0723*** (0.0254)	-0.1656*** (0.0260)	-0.0903*** (0.0204)	-0.1721*** (0.0240)	-0.1095*** (0.0156)
Nonmetropolitan	-0.2186*** (0.0325)	-0.1848*** (0.0259)	-0.1860*** (0.0265)	-0.1528*** (0.0208)	-0.1101*** (0.0244)	-0.0884*** (0.0159)
Black	0.5746*** (0.0410)	0.3622*** (0.0326)	0.5215*** (0.0334)	0.3428*** (0.0263)	0.4256*** (0.0309)	0.2740*** (0.0201)
Income <u>2/</u>	-0.1140 (0.0818)	0.1372** (0.0651)	-0.1300* (0.0667)	0.0741 (0.0523)	-0.3531*** (0.0615)	-0.1861*** (0.0400)
Income squared <u>3/</u>	0.2083 (0.3517)	-0.3829 (0.2798)	0.3614 (0.2866)	-0.1403 (0.2251)	1.0590*** (0.2644)	0.6195*** (0.1721)
Summer quarter	0.0500 (0.0358)	0.0210 (0.0284)	0.0756*** (0.0291)	0.0371 (0.0229)	0.0739*** (0.0269)	0.0411** (0.0175)
Fall quarter	0.1922*** (0.0345)	0.1035*** (0.0275)	0.0365 (0.0281)	-0.0093 (0.0221)	0.0658** (0.0259)	0.0304* (0.0169)
Winter quarter	0.1104*** (0.0348)	0.0598** (0.0277)	0.0540* (0.0284)	0.0146 (0.0223)	0.0923*** (0.0262)	0.0567*** (0.0171)
Household size (Inverse)	0.3801*** (0.0638)	0.3061*** (0.0507)	0.4383*** (0.0520)	0.3701*** (0.0408)	0.1203** (0.0479)	0.0753** (0.0312)
Guest meals	0.2485*** (0.0119)	0.1790*** (0.0095)	0.1302*** (0.0097)	0.0875*** (0.0076)	0.1078*** (0.0089)	0.0676*** (0.0058)
% Age 0-2	-0.4045*** (0.1392)	-0.2583** (0.1107)	-0.3278*** (0.1134)	-0.1819** (0.0891)	-0.4502*** (0.1046)	-0.2460*** (0.0681)
% Age 3-12	-0.2607*** (0.0820)	-0.1487** (0.0652)	-0.1943*** (0.0668)	-0.0860 (0.0524)	-0.2664*** (0.0616)	-0.1547*** (0.0401)
% Age 13-19	-0.3022*** (0.0870)	-0.1659** (0.0692)	-0.2349*** (0.0709)	-0.1089* (0.0556)	-0.3203*** (0.0654)	-0.1913*** (0.0426)
% Age 20-39	-0.2533*** (0.0450)	-0.1070*** (0.0358)	-0.1866*** (0.0367)	-0.0692** (0.0288)	-0.1915*** (0.0338)	-0.0988*** (0.0220)
% Age 65 & over	-0.0942** (0.0453)	-0.0373 (0.0360)	-0.0400 (0.0369)	-0.0193 (0.0290)	-0.0034 (0.0341)	-0.0004 (0.0222)
Summary Statistics: <u>4/</u>						
R ²	0.118	0.101	0.114	0.095	0.090	0.077
F-Urbanization	23.146***	26.402***	29.054***	27.038***	25.948***	26.593***
F-Region	27.926***	39.473***	33.903***	44.012***	16.247***	8.312***
F-Season	11.547***	5.542***	2.426*	1.625	4.619***	3.889***
F-Age Structure	10.289***	4.001***	9.447***	2.701**	17.087***	12.025***
F-Income	2.833*	5.166**	4.427**	2.876*	36.299***	21.810***

See footnotes at end of table.

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Appendix table 3--1977-78 Nationwide Food Consumption Survey: Meat consumption regression equations 1/--continued

Item	Chicken, Parts		Chicken, Processed		Turkey	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.1781*** (0.0333)	0.1475*** (0.0305)	-0.0003 (0.0133)	0.0058 (0.0192)	0.1203*** (0.0418)	0.1067*** (0.0313)
Northcentral	-0.2012*** (0.0171)	-0.1944*** (0.0156)	0.0089 (0.0068)	0.0074 (0.0098)	-0.0393* (0.0214)	-0.0466*** (0.0160)
South	-0.1609*** (0.0163)	-0.1603*** (0.0149)	-0.0007 (0.0065)	-0.0073 (0.0094)	-0.0264 (0.0204)	-0.0397 (0.0153)
West	-0.1779*** (0.0186)	-0.1437*** (0.0171)	-0.0068 (0.0075)	-0.0100 (0.0107)	-0.0256 (0.0234)	-0.0343* (0.0175)
Suburban	0.0085 (0.0154)	0.0212 (0.0141)	-0.0019 (0.0062)	-0.0020 (0.0089)	0.0156 (0.0193)	0.0131 (0.0045)
Nonmetropolitan	-0.0741*** (0.0157)	-0.0642*** (0.0144)	-0.0018 (0.0063)	-0.0001 (0.0090)	-0.0283 (0.0197)	-0.0278* (0.0148)
Black	0.0846*** (0.0198)	0.0457** (0.0181)	0.0113 (0.0079)	0.0232** (0.0114)	0.0541** (0.0249)	0.0192 (0.0186)
Income <u>2/</u>	0.1656*** (0.0395)	0.1715*** (0.0362)	0.0575*** (0.0158)	0.0886*** (0.0228)	0.0191 (0.0495)	0.0589 (0.0371)
Income squared <u>3/</u>	-0.5373*** (0.1698)	-0.5297*** (0.1555)	-0.1604** (0.0679)	-0.2300** (0.0979)	-0.2359 (0.2130)	-0.3056* (0.1597)
Summer quarter	0.0042 (0.0173)	0.0000 (0.0158)	-0.0024 (0.0069)	-0.0040 (0.0099)	-0.0236 (0.0217)	-0.0151 (0.0162)
Fall quarter	-0.0216 (0.0167)	-0.0247 (0.0153)	-0.0077 (0.0067)	-0.0149 (0.0096)	0.1492*** (0.0209)	0.1010*** (0.0157)
Winter quarter	-0.0283* (0.0168)	-0.0265* (0.0154)	-0.0101 (0.0067)	-0.0156 (0.0097)	0.0534** (0.0211)	0.0390** (0.0158)
Household size (Inverse)	0.2838*** (0.0308)	0.2550*** (0.0282)	0.0343*** (0.0123)	0.0398** (0.0177)	-0.0388 (0.0386)	-0.0374 (0.0289)
Guest meals	0.0201*** (0.0057)	0.0162*** (0.0053)	0.0023 (0.0023)	0.0037 (0.0033)	0.1082*** (0.0072)	0.0741*** (0.0054)
% Age 0-2	0.1106* (0.0672)	0.0670 (0.0615)	0.0118 (0.0269)	-0.0029 (0.0387)	-0.0530 (0.0843)	-0.0543 (0.0632)
% Age 3-12	0.0583 (0.0396)	0.0579 (0.0362)	0.0138 (0.0158)	0.0107 (0.0228)	-0.0463 (0.0496)	-0.0440 (0.0372)
% Age 13-19	0.0486 (0.0420)	0.0419 (0.0384)	0.0367** (0.0168)	0.0405* (0.0242)	-0.0597 (0.0527)	-0.0443 (0.0395)
% Age 20-39	0.0139 (0.0217)	0.0443** (0.0199)	-0.0090 (0.0087)	-0.0147 (0.0125)	-0.0686** (0.0273)	-0.0364* (0.0204)
% Age 65 & over	-0.0415* (0.0219)	-0.0262 (0.0200)	0.0050 (0.0087)	0.0074 (0.0126)	-0.0582** (0.0274)	-0.0271 (0.0206)
Summary statistics: <u>4/</u>						
R ²	0.049	0.053	0.006	0.006	0.036	0.032
F-Urbanization	18.390***	21.434***	0.058	0.036	2.883*	4.504**
F-Region	57.131***	60.900***	1.581	1.218	1.187	3.380**
F-Season	1.786	1.851	0.947	1.309	27.222***	22.045***
F-Age Structure	2.772**	3.548***	1.655	1.463	1.693	1.039
F-Income	18.145***	24.213***	15.393***	18.482***	0.007	1.433

See footnotes at end of table.

Appendix table 3--1977-78 Nationwide Food Consumption Survey: Meat consumption regression equations 1/--continued

Item	Turkey, Whole		Turkey, Parts		Poultry, Other	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variable:						
Intercept	0.0782** (0.0382)	0.0527** (0.0250)	0.0421** (0.0180)	0.0540*** (0.0196)	0.0139 (0.0091)	0.0068 (0.0127)
Northcentral	-0.0317 (0.0195)	-0.0216* (0.0128)	-0.0076 (0.0092)	-0.0250** (0.0100)	0.0007 (0.0047)	0.0047 (0.0065)
South	-0.0177 (0.0186)	-0.0111 (0.0122)	-0.0087 (0.0088)	-0.0286*** (0.0096)	-0.0026 (0.0045)	0.0018 (0.0062)
West	-0.0204 (0.0214)	-0.0161 (0.0139)	-0.0052 (0.0101)	-0.0182* (0.0110)	-0.0032 (0.0051)	-0.0027 (0.0071)
Suburban	0.0156 (0.0177)	0.0125 (0.0115)	-0.0001 (0.0083)	0.0006 (0.0091)	0.0034 (0.0042)	0.0050 (0.0059)
Nonmetropolitan	-0.0164 (0.0180)	-0.0144 (0.0118)	-0.0119 (0.0085)	-0.0134 (0.0092)	-0.0044 (0.0043)	-0.0042 (0.0060)
Black	-0.0135 (0.0227)	-0.0057 (0.0148)	0.0676*** (0.0107)	0.0249** (0.0116)	-0.0010 (0.0054)	0.0001 (0.0075)
Income <u>2/</u>	-0.0339 (0.0453)	-0.0229 (0.0296)	0.0529** (0.0213)	0.0819*** (0.0232)	-0.0031 (0.0108)	0.0042 (0.0150)
Income squared <u>3/</u>	-0.0404 (0.1946)	-0.0142 (0.1271)	-0.1955** (0.0918)	-0.2914*** (0.0998)	0.0828* (0.0466)	0.0630 (0.0645)
Summer quarter	-0.0177 (0.0198)	-0.0099 (0.0129)	-0.0058 (0.0093)	-0.0052 (0.0102)	-0.0021 (0.0047)	-0.0010 (0.0066)
Fall quarter	0.1431*** (0.0191)	0.0954*** (0.0125)	0.0060 (0.0090)	0.0056 (0.0098)	0.0064 (0.0046)	0.0118* (0.0063)
Winter quarter	0.0504*** (0.0193)	0.0340*** (0.0126)	0.0029 (0.0091)	0.0050 (0.0099)	0.0031 (0.0046)	0.0062 (0.0064)
Household size (Inverse)	-0.0477 (0.0353)	-0.0381* (0.0230)	0.0089 (0.0166)	0.0007 (0.0181)	-0.0195** (0.0084)	-0.0266** (0.0117)
Guest meals	0.0997*** (0.0066)	0.0640*** (0.0043)	0.0084*** (0.0031)	0.0101*** (0.0034)	0.0102*** (0.0016)	0.0173*** (0.0022)
% Age 0-2	-0.0439 (0.0770)	-0.0288 (0.0503)	-0.0091 (0.0363)	-0.0256 (0.0395)	-0.0237 (0.0184)	-0.0220 (0.0255)
% Age 3-12	-0.0134 (0.0454)	-0.0096 (0.0296)	-0.0329 (0.0214)	-0.0344 (0.0233)	-0.0201* (0.0109)	-0.0186 (0.0150)
% Age 13-19	-0.0368 (0.0481)	-0.0199 (0.0314)	-0.0229 (0.0227)	-0.0243 (0.0247)	-0.0076 (0.0115)	-0.0127 (0.0159)
% Age 20-39	-0.0425* (0.0249)	-0.0216 (0.0163)	-0.0261** (0.0117)	-0.0148 (0.0128)	0.0019 (0.0060)	-0.0014 (0.0083)
% Age 65 & over	-0.0485* (0.0251)	-0.0308* (0.0164)	-0.0097 (0.0118)	0.0037 (0.0129)	0.0040 (0.0060)	0.0091 (0.0083)
Summary statistics: <u>4/</u>						
R ²	0.036	0.036	0.009	0.008	0.008	0.010
F-Urbanization	1.811	2.981*	1.412	1.607	1.863	1.362
F-Region	0.899	1.028	0.369	3.354**	0.315	0.388
F-Season	28.903***	29.438***	0.617	0.512	1.316	1.784
F-Age Structure	1.007	0.829	1.489	1.067	1.117	0.996
F-Income	1.460	1.422	5.621**	11.784***	0.381	0.957

See footnotes at end of table.

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Appendix table 3--1977-78 Nationwide Food Consumption Survey: Meat consumption regression equations 1/--continued

Item	Fish and Shellfish		Fish		Shellfish	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variable:						
Intercept	0.4572*** (0.0557)	0.6691*** (0.0715)	0.4025*** (0.0440)	0.5967*** (0.0570)	0.0547 (0.0333)	0.0724* (0.0403)
Northcentral	-0.1056*** (0.0285)	-0.2542*** (0.0366)	-0.0664*** (0.0225)	-0.1891*** (0.0291)	-0.0392** (0.0170)	-0.0651*** (0.0206)
South	0.0520* (0.0272)	-0.1002*** (0.0349)	0.0116 (0.0215)	-0.1386*** (0.0278)	0.0404** (0.0162)	0.0383* (0.0197)
West	-0.0426 (0.0311)	-0.0746* (0.0400)	-0.0168 (0.0246)	-0.0501 (0.0318)	-0.0259 (0.0186)	-0.0245 (0.0226)
Suburban	-0.0580** (0.0257)	-0.1386*** (0.0330)	-0.0447** (0.0203)	-0.0861*** (0.0263)	-0.0133 (0.0154)	-0.0525*** (0.0186)
Nonmetropolitan	-0.1031*** (0.0262)	-0.1996*** (0.0337)	-0.0695*** (0.0207)	-0.1371*** (0.0268)	-0.0336** (0.0157)	-0.0626*** (0.0190)
Black	0.2939*** (0.0331)	0.2362*** (0.0425)	0.2856*** (0.0262)	0.2251*** (0.0339)	0.0082 (0.0198)	0.0111 (0.0240)
Income <u>2/</u>	0.1196* (0.0659)	0.3678*** (0.0847)	0.0250 (0.0521)	0.1441** (0.0675)	0.0945** (0.0394)	0.2237*** (0.0478)
Income squared <u>3/</u>	-0.1758 (0.2836)	-0.3351 (0.3642)	-0.0136 (0.2241)	-0.0034 (0.2902)	-0.1622 (0.1695)	-0.3317 (0.2055)
Summer quarter	0.0012 (0.0288)	0.0236 (0.0370)	-0.0131 (0.0228)	0.0029 (0.0295)	0.0143 (0.0172)	0.0208 (0.0209)
Fall quarter	-0.0577** (0.0278)	-0.0446 (0.0357)	-0.0858*** (0.0220)	-0.0736*** (0.0285)	0.0281* (0.0166)	0.029 (0.0202)
Winter quarter	-0.0854*** (0.0281)	-0.0235 (0.0361)	-0.0892*** (0.0222)	-0.0381 (0.0288)	0.0038 (0.0168)	0.0147 (0.0204)
Household size (Inverse)	0.0422 (0.0514)	0.0872 (0.0660)	0.0794* (0.0406)	0.1181** (0.0526)	-0.0372 (0.0307)	-0.0309 (0.0373)
Guest meals	0.0832*** (0.0096)	0.1167*** (0.0123)	0.0466*** (0.0076)	0.0641*** (0.0098)	0.0366*** (0.0057)	0.0527*** (0.0070)
■ Age 0-2	-0.3851*** (0.1122)	-0.5839*** (0.1441)	-0.2686*** (0.0887)	-0.3866*** (0.1148)	-0.1165* (0.0671)	-0.1974** (0.0813)
■ Age 3-12	-0.3087*** (0.0661)	-0.3883*** (0.0849)	-0.2371*** (0.0522)	-0.3074*** (0.0676)	-0.0716* (0.0395)	-0.0809* (0.0479)
■ Age 13-19	-0.1519** (0.0701)	-0.2202** (0.0900)	-0.1278** (0.0554)	-0.1981*** (0.0717)	-0.0241 (0.0419)	-0.0221 (0.0508)
% Age 20-39	-0.1127*** (0.0363)	-0.0650 (0.0466)	-0.1128*** (0.0287)	-0.1083*** (0.0371)	0.0001 (0.0217)	0.0433 (0.0263)
% Age 65 & over	-0.0941*** (0.0365)	-0.0717 (0.0469)	-0.0489* (0.0289)	-0.0226 (0.0374)	-0.0452** (0.0218)	-0.0491* (0.0265)
Summary statistics: <u>4/</u>						
R ²	0.040	0.051	0.041	0.042	0.013	0.023
F-Urbanization	7.736***	18.173***	5.710***	13.190***	2.373*	6.127***
F-Region	11.998***	16.852***	4.977***	16.541***	9.213**	9.724***
F-Season	4.716***	1.341	9.005***	3.232**	1.173	0.728
F-Age Structure	7.946***	6.649***	8.826***	8.085***	1.717	2.895**
F-Income	5.179**	33.410***	0.439	9.591***	8.591***	34.443***

See footnotes at end of table.

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Appendix table 3--1977-78 Nationwide Food Consumption Survey: Meat consumption regression equations 1/--continued

Item	Franks		Luncheon meats		Variety meats	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variable:						
Intercept	0.1478*** (0.0147)	0.1777*** (0.0158)	0.2495*** (0.0227)	0.3784*** (0.0342)	0.1115*** (0.0220)	0.0848*** (0.0165)
Northcentral	-0.0135* (0.0075)	-0.0307*** (0.0081)	0.0757*** (0.0116)	0.0553*** (0.0175)	-0.0041 (0.0113)	-0.0197** (0.0085)
South	-0.0246*** (0.0072)	-0.0442*** (0.0077)	0.0079 (0.0111)	-0.0664*** (0.0167)	0.0026 (0.0107)	-0.0052 (0.0081)
West	-0.0419*** (0.0082)	-0.0649*** (0.0089)	-0.0086 (0.0127)	-0.0611*** (0.0191)	-0.0041 (0.0123)	-0.0081 (0.0092)
Suburban	-0.0037 (0.0068)	-0.0037 (0.0073)	-0.0232** (0.0105)	-0.0305* (0.0158)	-0.0250** (0.0102)	-0.0230*** (0.0076)
Nonmetropolitan	0.0035 (0.0069)	-0.0057 (0.0075)	-0.0174 (0.0107)	-0.0384** (0.0161)	-0.0360*** (0.0104)	-0.0326*** (0.0078)
Black	0.0570*** (0.0087)	0.0480*** (0.0094)	0.0932*** (0.0135)	0.1024*** (0.0204)	0.2461*** (0.0131)	0.1621*** (0.0098)
Income <u>2/</u>	-0.0766*** (0.0174)	-0.0691*** (0.0188)	-0.1172*** (0.0269)	-0.0820** (0.0406)	-0.0951*** (0.0261)	-0.0420** (0.0196)
Income squared <u>3/</u>	0.1337* (0.0750)	0.1214 (0.0807)	0.3226*** (0.1157)	0.2355 (0.1744)	0.2712** (0.1121)	0.1520* (0.0842)
Summer quarter	0.0138* (0.0076)	0.0164** (0.0082)	0.0250** (0.0118)	0.0396** (0.0177)	-0.0158 (0.0114)	-0.0047 (0.0086)
Fall quarter	-0.0218*** (0.0074)	-0.0151* (0.0079)	0.0023 (0.0114)	0.0078 (0.0171)	-0.0020 (0.0110)	0.0025 (0.0083)
Winter quarter	-0.0124* (0.0074)	-0.0044 (0.0080)	-0.0020 (0.0115)	0.0187 (0.0173)	-0.0011 (0.0111)	0.0019 (0.0083)
Household size (Inverse)	0.0512*** (0.0136)	0.0475*** (0.0146)	0.0802*** (0.0210)	0.0963*** (0.0316)	0.0730*** (0.0203)	0.0471*** (0.0153)
Guest meals	0.0219*** (0.0025)	0.0247*** (0.0027)	0.0319*** (0.0039)	0.0516*** (0.0059)	0.0138*** (0.0038)	0.0122*** (0.0028)
% Age 0-2	0.0025 (0.0297)	-0.0100 (0.0319)	-0.1445*** (0.0458)	-0.2150*** (0.0690)	-0.0383 (0.0444)	-0.0060 (0.0333)
% Age 3-12	0.0594*** (0.0175)	0.0455** (0.0188)	-0.0484* (0.0270)	-0.0789* (0.0406)	-0.0307 (0.0261)	-0.0232 (0.0196)
% Age 13-19	0.0904*** (0.0185)	0.0766*** (0.0200)	0.0150 (0.0286)	0.0213 (0.0431)	-0.0673** (0.0277)	-0.0397* (0.0208)
% Age 20-39	-0.0104 (0.0096)	-0.0120 (0.0103)	-0.0191 (0.0148)	-0.0148 (0.0223)	-0.0481*** (0.0144)	-0.0378*** (0.0108)
% Age 65 & over	-0.0395*** (0.0097)	-0.0449*** (0.0104)	-0.1258*** (0.0149)	-0.1708*** (0.0225)	0.0046 (0.0144)	0.0220** (0.0108)
Summary statistics: <u>4/</u>						
R ²	0.035	0.031	0.036	0.030	0.067	0.058
F-Urbanization	0.616	0.299	2.550*	3.102**	6.253***	9.101***
F-Region	9.606***	20.409***	21.064***	21.931***	0.178	1.982
F-Season	8.645***	5.366***	2.308*	1.897	0.854	0.300
F-Age Structure	13.092***	10.542***	18.560***	15.781***	4.149***	6.642***
F-Income	28.678***	20.044***	22.235***	4.648**	15.223***	4.276**

Appendix table 3--1977-78 Nationwide Food Consumption Survey: Meat
consumption regression equations

- 1/ The quantity and value of meat are measured, respectively, in pounds per week and dollars per week of food used from household supplies. Sample means of the independent variables are: North Central, 0.2425; South, 0.3392; West, 0.1708; Suburban, 0.3511; Nonmetro, 0.3436; Black, 0.1242; Income, 4,459; Income Squared, 31,430,000; Summer Quarter, 0.2323; Fall Quarter, 0.2695; Winter Quarter, 0.2606; Household Size (inverse), 0.4645; Guest Meals (per household member), 0.4662; Percent Age 0-2, 0.03425; Percent Age 3-12, 0.1225; Percent Age 13-19, 0.0953; Percent Age 20-39, 0.2718; Percent Age 65 and Over, 0.1910. Income is reported after-tax income for the previous year measured in dollars per year. *** denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 10% level. Numbers in parentheses are standard error for the parameter estimates.
- 2/ The coefficient on income and its standard error have been multiplied by a factor of 10^3 for convenience in presentation.
- 3/ The coefficient on Income Squared and its standard error are multiplied by a factor of 10^9 for convenience in presentation.
- 4/ R^2 is the coefficient of determination. "F" in F-Urbanization, F-Region, etc., denotes Fisher's F-test statistic which is used to test for significant differences within each reported category. The "*" denotes significance levels.

Appendix table 4--Household disposable income and size: By category,
Spring 1965 and 1977, and 1977-78 averages

Category	Household disposable income			Household size		
	Spring			Spring		
	1965	1977	1977	1965	1977	1977
	-----Dollars-----			-----Number-----		
Region						
Northeast	6,614	11,959	12,207	3.51	3.05	3.07
Northcentral	6,189	12,644	12,231	3.59	3.10	3.15
South	5,057	9,708	9,936	3.55	3.07	3.00
West	6,637	11,926	12,373	3.37	3.03	2.95
Race						
Black	3,876	7,698	7,642	4.14	3.23	3.31
Non-black	6,207	11,976	12,111	3.40	3.04	3.01
Income Quintile						
I	1,529	3,311	3,379	2.69	2.07	2.05
II	3,612	6,877	6,990	3.49	2.78	2.77
III	5,324	10,341	10,444	3.68	3.24	3.25
IV	7,124	14,338	14,489	3.84	3.60	3.54
V	12,139	23,873	23,807	3.93	3.67	3.63
Household size						
1	2,820	6,021	5,784	1.00	1.00	1.00
2	5,469	10,558	11,118	2.00	2.00	2.00
3	6,346	12,446	12,567	3.00	3.00	3.00
4	6,866	14,120	14,202	4.00	4.00	4.00
5	7,308	15,488	14,874	5.00	5.00	5.00
6 or more	6,382	14,792	14,768	7.08	6.75	6.80
Urbanization						
Central city	1/	10,186	10,140	1/	2.81	2.86
Suburban	1/	13,021	13,474	1/	3.28	3.20
Nonmetropolitan	1/	11,073	10,817	1/	3.06	3.05
Grand Average	5,947	11,467	11,562	3.53	3.07	3.05

1/ Comparable data, by urbanization, is not available in the Spring 1965 survey.

Appendix table 5--Money value of weekly home meat
consumption, Spring 1965 and 1977

Item	Year	
	1965	1977
	Dollars per capita	
Total meats	2.71	5.15
Red meats	1.90	3.42
Beef	1.14	2.11
Loin and rib		
Steaks	.29	.52
Roasts	.03	.03
Round and chuck		
Steaks	.26	.35
Roasts	.27	.47
Ground	.21	.60
Other	.08	.13
Pork	.68	1.19
Fresh <u>1/</u>	.22	.44
Processed <u>1/</u>	.24	.38
Bacon and sausage	.22	.36
Veal	.04	.06
Lamb, mutton, goat	.04	.06
Poultry	.31	.64
Chicken	.28	.56
Whole	.22	.32
Parts	.05	.19
Processed	.01	.05
Turkey	.02	.08
Whole	.02	.03
Parts	.01	.05
Other	<u>2/</u>	.01
Fish and shellfish	.21	.54
Fish	.17	.44
Shellfish	.04	.10
Miscellaneous	.30	.56
Franks	.09	.16
Luncheon meats	.17	.33
Variety meats	.04	.07

1/ Excluding bacon and sausage

2/ Less than .005

Appendix table 6--Money value of weekly home meat consumption, By region,
Spring 1977

Item	Region			
	North East	North Central	South	West
	Dollars per capita			
Total meats	5.80	4.93	5.01	4.83
Red meats	3.72	3.31	3.34	3.27
Beef	2.31	2.04	2.02	2.08
Loin and rib				
Steaks	.62	.50	.48	.51
Roasts	.05	.02	.03	.04
Round and chuck				
Steaks	.42	.30	.32	.39
Roasts	.50	.46	.46	.43
Ground	.59	.65	.60	.55
Other	.13	.10	.13	.15
Pork	1.17	1.21	1.27	1.01
Fresh ^{1/}	.48	.44	.45	.36
Processed ^{1/}	.40	.42	.36	.35
Bacon and sausage	.28	.35	.47	.31
Veal	.13	.03	.03	.06
Lamb, mutton, goat	.11	.03	.01	.12
Poultry	.84	.54	.62	.56
Chicken	.72	.48	.56	.47
Whole	.34	.29	.37	.28
Parts	.31	.14	.15	.15
Processed	.07	.06	.03	.04
Turkey	.11	.07	.06	.08
Whole	.03	.04	.02	.02
Parts	.08	.03	.04	.06
Other	.01	^{2/}	^{2/}	.01
Fish and shellfish	.69	.43	.54	.49
Fish	.54	.39	.44	.39
Shellfish	.14	.04	.10	.10
Miscellaneous	.56	.64	.51	.50
Franks	.18	.16	.14	.13
Luncheon meats	.32	.42	.29	.31
Variety meats	.06	.06	.08	.06

^{1/} Excluding bacon and sausage

^{2/} Less than .005

Appendix table 7--Money value of weekly home meat consumption, By
income quintile, 1977

Item	Income Quintile				
	I	II	III	IV	V
	Dollars per capita				
Total meats	5.18	4.65	4.75	5.27	5.61
Red meats	3.19	3.12	3.19	3.49	3.78
Beef	1.79	1.89	1.95	2.17	2.46
Loin and rib					
Steaks	.28	.46	.42	.58	.71
Roasts	.03	.01	.03	.03	.07
Round and chuck					
Steaks	.37	.35	.33	.33	.36
Roasts	.38	.39	.47	.49	.54
Ground	.56	.57	.59	.61	.64
Other	.16	.11	.11	.12	.14
Pork	1.30	1.17	1.12	1.23	1.13
Fresh ^{1/}	.49	.47	.42	.45	.39
Processed ^{1/}	.36	.33	.35	.44	.44
Bacon and sausage	.45	.37	.36	.35	.30
Veal	.05	.03	.05	.04	.10
Lamb, mutton, goat	.05	.03	.07	.05	.10
Poultry	.75	.60	.53	.63	.70
Chicken	.66	.54	.48	.53	.58
Whole	.41	.35	.30	.27	.26
Parts	.20	.14	.14	.19	.23
Processed	.05	.04	.03	.06	.08
Turkey	.08	.05	.04	.10	.11
Whole	.02	.01	.01	.04	.04
Parts and offals	.07	.04	.03	.06	.07
Other	^{2/}	.01	^{2/}	^{2/}	.01
Fish and shellfish	.60	.42	.49	.55	.64
Fish	.49	.39	.42	.46	.46
Shellfish	.11	.03	.07	.08	.17
Miscellaneous	.55	.52	.54	.60	.49
Franks	.07	.14	.15	.18	.14
Luncheon meats	.35	.30	.33	.37	.31
Variety meats	.13	.08	.06	.05	.04

^{1/} Excluding bacon and sausage

^{2/} Less than .005

Appendix table 8--Money value of weekly home meat consumption, By household size, Spring 1977

Item	Household size					
	1	2	3	4	5	6 or more
	Dollars per capita					
Total meats	6.72	6.29	5.20	4.78	4.75	4.26
Red meats	4.33	4.23	3.50	3.17	3.06	2.82
Beef	2.58	2.63	2.20	1.94	1.88	1.73
Loin and rib						
Steaks	.76	.76	.53	.48	.46	.31
Roasts	.04	.05	.03	.03	.04	.02
Round and chuck						
Steaks	.39	.39	.38	.30	.34	.36
Roasts	.58	.65	.48	.40	.39	.36
Ground	.61	.61	.65	.59	.57	.60
Other	.20	.17	.13	.14	.08	.09
Pork	1.50	1.43	1.21	1.11	1.09	1.00
Fresh <u>1/</u>	.53	.46	.43	.44	.46	.39
Processed <u>1/</u>	.48	.50	.37	.35	.35	.31
Bacon and sausage	.49	.48	.40	.32	.29	.30
Veal	.10	.10	.05	.05	.05	.04
Lamb, mutton, goat	.15	.06	.05	.07	.04	.05
Poultry	.96	.78	.61	.62	.62	.49
Chicken	.91	.67	.52	.55	.54	.42
Whole	.46	.39	.31	.30	.29	.28
Parts	.39	.21	.17	.19	.20	.11
Processed	.06	.07	.04	.06	.06	.03
Turkey	.04	.10	.09	.06	.08	.07
Whole	<u>2/</u>	.03	.04	.02	.04	.03
Parts	.04	.07	.05	.04	.04	.04
Other	.01	.01	.01	.01	<u>2/</u>	<u>2/</u>
Fish and shellfish	.80	.68	.54	.47	.53	.42
Fish	.62	.57	.42	.39	.41	.38
Shellfish	.17	.11	.12	.08	.12	.04
Miscellaneous	.64	.60	.55	.53	.53	.53
Franks	.14	.14	.15	.17	.16	.16
Luncheon meats	.36	.37	.34	.31	.31	.32
Variety meats	.14	.09	.06	.05	.06	.05

1/ Excluding bacon and sausage

2/ Less than .005

Appendix table 9--Spring 1965 Household Food Consumption Survey, Meat consumption regression equations 1/

Item	Total Meats		Red Meats		Beef	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	4.6716*** (0.1577)	6.2017*** (0.2039)	2.9773*** (0.1176)	4.2611*** (0.1684)	1.6220*** (0.0906)	2.2149*** (0.1269)
Northcentral	0.1146 (0.0884)	-0.7853*** (0.1143)	0.3473*** (0.0659)	-0.2749*** (0.0944)	0.2407*** (0.0508)	-0.1226* (0.0711)
South	-0.2721*** (0.0875)	-1.3243*** (0.1131)	-0.1910*** (0.0652)	-0.8626*** (0.0934)	-0.2301*** (0.0503)	-0.6347*** (0.0704)
West	0.0641 (0.1073)	-0.6518*** (0.1387)	0.3105*** (0.0800)	-0.2065* (0.1146)	0.3543*** (0.0617)	0.1044 (0.0863)
Rural	0.2153*** (0.0674)	-0.2087** (0.0871)	0.2064*** (0.0503)	-0.0714 (0.0719)	0.1339*** (0.0387)	0.0185 (0.0542)
Black	1.0636*** (0.1035)	0.3508*** (0.1337)	0.1012 (0.0772)	-0.1201 (0.1105)	-0.2063*** (0.0595)	-0.3354*** (0.0832)
Income 2/	1.1982*** (0.1402)	2.7998*** (0.1813)	1.0142*** (0.1046)	2.2539*** (0.1497)	0.8868*** (0.0806)	1.7049*** (0.1128)
Income squared 3/	-2.5007*** (0.3490)	-5.3108*** (0.4510)	-1.9613*** (0.2602)	-4.2468*** (0.3725)	-1.8109*** (0.2005)	-3.2726*** (0.2807)
Household size (Inverse)	-0.1069 (0.1989)	-0.0256 (0.2571)	-0.4138*** (0.1483)	-0.3323 (0.2123)	-0.1897* (0.1143)	-0.0620 (0.1600)
Guest meals	0.2487*** (0.0057)	0.2730*** (0.0073)	0.1484*** (0.0042)	0.1846*** (0.0060)	0.0844*** (0.0033)	0.0993*** (0.0046)
% Age 0-2	-2.9811*** (0.3851)	-3.7891*** (0.4978)	-2.0287*** (0.2872)	-2.8528*** (0.4111)	-1.0621*** (0.2213)	-1.4459*** (0.3098)
% Age 3-12	-2.4408*** (0.1933)	-3.0227*** (0.2499)	-1.8423*** (0.1442)	-2.4280*** (0.2063)	-0.8832*** (0.1111)	-1.1682*** (0.1555)
% Age 13-19	-1.2234*** (0.2300)	-1.5546*** (0.2973)	-0.9937*** (0.1715)	-1.3616*** (0.2455)	-0.4863*** (0.1322)	-0.6862*** (0.1850)
% Age 20-39	-0.1372 (0.1373)	-0.0506 (0.1774)	-0.0606 (0.1024)	-0.0679 (0.1465)	-0.0405 (0.0789)	-0.0558 (0.1104)
% Age 65 & over	-0.8687*** (0.1189)	-1.3390*** (0.1537)	-0.5850*** (0.0887)	-0.9556*** (0.1270)	-0.4280*** (0.0683)	-0.7316*** (0.0957)
Summary statistics: 4/						
R ²	.280	.276	.223	.226	.162	.167
F-INCOME	74.667***	252.300***	98.822***	240.273***	124.856***	240.549***
F-AGE STRUCTURE	43.804***	44.524***	41.162***	38.512***	19.927***	21.923***
F-REGION	9.028***	45.939***	33.269***	33.431***	51.020***	42.766***

See footnotes at end of table.

continued--

Appendix table 9--Spring 1965 Household Food Consumption Survey, Meat consumption regression equations 1/--continued

Item	Steaks (loin and rib)		Roasts (loin and rib)		Steaks (round and chuck)	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.2347*** (0.0452)	0.4019*** (0.0793)	0.0773*** (0.0160)	0.1145*** (0.0256)	0.3737*** (0.0387)	0.4753*** (0.0507)
Northcentral	0.0065 (0.0253)	-0.0726 (0.0444)	-0.0060 (0.0090)	-0.0226 (0.0143)	-0.1045*** (0.0217)	-0.1721*** (0.0284)
South	-0.0412 (0.0251)	-0.1583*** (0.0440)	-0.0239*** (0.0089)	-0.0465*** (0.0142)	-0.1264*** (0.0215)	-0.1880*** (0.0281)
West	0.0457 (0.0308)	0.0675 (0.0539)	0.0091 (0.0109)	-0.0061 (0.0174)	0.0705*** (0.0263)	0.0259 (0.0345)
Rural	0.0274 (0.0193)	0.0059 (0.0339)	0.0068 (0.0069)	0.0042 (0.0109)	-0.0381** (0.0165)	-0.0563*** (0.0217)
Black	-0.0380 (0.0297)	-0.0541 (0.0520)	-0.0127 (0.0105)	-0.0220 (0.0168)	-0.0768*** (0.0254)	-0.1134*** (0.0333)
Income <u>2</u> /	0.5210*** (0.0402)	1.0078*** (0.0705)	0.0529*** (0.0143)	0.0873*** (0.0227)	0.1930*** (0.0344)	0.2926*** (0.0451)
Income squared <u>3</u> /	-0.9226*** (0.1000)	-1.7255*** (0.1754)	-0.1244*** (0.0355)	-0.2051*** (0.0566)	-0.4093*** (0.0856)	-0.5992*** (0.1121)
Household size (Inverse)	-0.0428 (0.0570)	0.0361 (0.1000)	-0.0523*** (0.0202)	-0.0520 (0.0323)	0.0921* (0.0488)	0.1549** (0.0639)
Guest meals	0.0150*** (0.0016)	0.0243*** (0.0028)	0.0008 (0.0006)	0.0007 (0.0009)	0.0175*** (0.0014)	0.0215*** (0.0018)
% Age 0-2	-0.2893*** (0.1104)	-0.6044*** (0.1935)	-0.1007** (0.0392)	-0.1365** (0.0625)	-0.1895** (0.0945)	-0.2431** (0.1238)
% Age 3-12	-0.1989*** (0.0554)	-0.3604*** (0.0971)	-0.0590*** (0.0197)	-0.0761** (0.0313)	-0.1073** (0.0474)	-0.1137* (0.0621)
% Age 13-19	-0.1602** (0.0659)	-0.3026*** (0.1156)	-0.0599** (0.0234)	-0.0743** (0.0373)	-0.0139 (0.0564)	0.0105 (0.0739)
% Age 20-39	0.0354 (0.0394)	0.1352* (0.0690)	-0.0355** (0.0140)	-0.0524** (0.0223)	0.0293 (0.0337)	0.0390 (0.0441)
% Age 65 & over	-0.1896*** (0.0341)	-0.3805*** (0.0598)	-0.0097 (0.0121)	-0.0264 (0.0193)	-0.1152*** (0.0292)	-0.1377*** (0.0382)
Summary statistics: <u>4</u> /						
R ²	.066	.083	.010	.009	.056	.057
F-INCOME	181.493***	223.191***	13.415***	14.381***	32.012***	43.414***
F-AGE STRUCTURE	9.195***	12.883***	4.539***	3.329***	4.964***	4.325***
F-REGION	3.327	7.968***	4.354***	4.175***	27.689***	26.094***

See footnotes at end of table.

Appendix table 9--Spring 1965 Household Food Consumption Survey, Meat consumption regression equations 1/--continued

Item	Roasts (round and chuck)		Beef, Ground		Beef, Other	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.5450*** (0.0430)	0.7253*** (0.0531)	0.2621*** (0.0325)	0.2916*** (0.0324)	0.1291*** (0.0239)	0.2063*** (0.0286)
Northcentral	0.0987*** (0.0241)	-0.0046 (0.0298)	0.2326*** (0.0182)	0.1725*** (0.0181)	0.0134 (0.0134)	-0.0232 (0.0160)
South	-0.0477** (0.0238)	-0.1482*** (0.0295)	0.0268 (0.0180)	-0.0412** (0.0180)	-0.0176 (0.0132)	-0.0524*** (0.0159)
West	0.0782*** (0.0292)	-0.0224 (0.0362)	0.1018*** (0.0221)	0.0078 (0.0220)	0.0490*** (0.0162)	0.0317 (0.0195)
Rural	-0.0206 (0.0184)	-0.0618*** (0.0227)	0.1439*** (0.0139)	0.1359*** (0.0138)	0.0144 (0.0102)	-0.0095 (0.0122)
Black	-0.1218*** (0.0282)	-0.1643*** (0.0349)	-0.0695*** (0.0213)	-0.0762*** (0.0212)	0.1124*** (0.0157)	0.0945*** (0.0188)
Income <u>2/</u>	0.1968*** (0.0382)	0.3230*** (0.0473)	-0.0676** (0.0289)	-0.0320 (0.0288)	-0.0093 (0.0212)	0.0262 (0.0254)
Income squared <u>3/</u>	-0.4266*** (0.0950)	-0.6734*** (0.1176)	0.0745 (0.0720)	0.0018 (0.0716)	-0.0025 (0.0528)	-0.0712 (0.0633)
Household size (Inverse)	-0.2540*** (0.0542)	-0.2903*** (0.0670)	0.0231 (0.0410)	0.0670 (0.0408)	0.0442 (0.0301)	0.0223 (0.0361)
Guest meals	0.0250*** (0.0015)	0.0280*** (0.0019)	0.0210*** (0.0012)	0.0189*** (0.0012)	0.0051*** (0.0009)	0.0060*** (0.0010)
% Age 0-2	-0.2827*** (0.1049)	-0.3129** (0.1298)	-0.1518* (0.0794)	-0.1335* (0.0790)	-0.0480 (0.0583)	-0.0155 (0.0699)
% Age 3-12	-0.3686*** (0.0527)	-0.4363*** (0.0651)	-0.0703* (0.0399)	-0.0754* (0.0397)	-0.0791*** (0.0293)	-0.1062*** (0.0351)
% Age 13-19	-0.2906*** (0.0626)	-0.3104*** (0.0775)	0.1089** (0.0474)	0.0924* (0.0472)	-0.0707** (0.0348)	-0.1018** (0.0417)
% Age 20-39	-0.1262*** (0.0374)	-0.1835*** (0.0463)	0.1006*** (0.0283)	0.0823*** (0.0282)	-0.0440** (0.0208)	-0.0764*** (0.0249)
% Age 65 & over	-0.0351 (0.0324)	-0.0932** (0.0401)	-0.0986*** (0.0245)	-0.0870*** (0.0244)	0.0203 (0.0180)	-0.0068 (0.0216)
Summary statistics: <u>4/</u>						
R ²	.070	.069	.097	.084	.022	.019
F-INCOME	26.765***	47.821***	6.595**	1.754	.288	.964
F-AGE STRUCTURE	13.502***	13.115***	10.114***	7.818***	3.651***	4.141***
F-REGION	17.941***	13.077***	74.263***	65.007***	6.706***	7.910***

See footnotes at end of table.

Appendix table 9—Spring 1965 Household Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Veal		Lamb, mutton, goat		Pork	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.1167*** (0.0123)	0.2281*** (0.0234)	0.1090*** (0.0170)	0.1905*** (0.0284)	1.1296*** (0.0682)	1.6275*** (0.0939)
Northcentral	-0.0566*** (0.0069)	-0.1324*** (0.0131)	-0.0863*** (0.0095)	-0.1608*** (0.0159)	0.2494*** (0.0383)	0.1409*** (0.0526)
South	-0.0550*** (0.0068)	-0.1243*** (0.0130)	-0.0841*** (0.0094)	-0.1517*** (0.0158)	0.1782*** (0.0379)	0.0480 (0.0521)
West	-0.0692*** (0.0084)	-0.1579*** (0.0160)	-0.0134 (0.0115)	-0.0511*** (0.0193)	0.0388 (0.0464)	-0.1020 (0.0639)
Rural	-0.0403*** (0.0053)	-0.0747*** (0.0100)	-0.0371*** (0.0072)	-0.0612*** (0.0121)	0.1498*** (0.0292)	0.0461 (0.0401)
Black	-0.0126 (0.0081)	-0.0273* (0.0154)	0.0352*** (0.0111)	0.0615*** (0.0187)	0.2850*** (0.0448)	0.1811*** (0.0616)
Income <u>2</u> /	0.0200* (0.0110)	0.0496** (0.0208)	0.0809*** (0.0151)	0.1659*** (0.0253)	0.0266 (0.0607)	0.3336*** (0.0835)
Income squared <u>3</u> /	-0.0637** (0.0273)	-0.1452*** (0.0519)	-0.0735* (0.0375)	-0.1776*** (0.0629)	-0.0133 (0.1510)	-0.6514*** (0.2077)
Household size (Inverse)	-0.0110 (0.0155)	-0.0147 (0.0296)	-0.0026 (0.0214)	-0.0202 (0.0358)	-0.2104** (0.0861)	-0.2355** (0.1184)
Guest meals	-0.0004 (0.0004)	-0.0005 (0.0008)	0.0011* (0.0006)	0.0028*** (0.0010)	0.0631*** (0.0024)	0.0829*** (0.0034)
X Age 0-2	-0.0388 (0.0301)	-0.0829 (0.0573)	-0.0358 (0.0414)	-0.0620 (0.0694)	-0.8921*** (0.1666)	-1.2620*** (0.2292)
X Age 3-12	-0.0337** (0.0151)	-0.0547* (0.0287)	-0.0457** (0.0208)	-0.0689** (0.0348)	-0.8797*** (0.0836)	-1.1362*** (0.1151)
X Age 13-19	-0.0239 (0.0180)	-0.0370 (0.0342)	-0.0366 (0.0247)	-0.0647 (0.0415)	-0.4468*** (0.0995)	-0.5737*** (0.1369)
X Age 20-39	-0.0035 (0.0107)	0.0081 (0.0204)	-0.0232 (0.0148)	-0.0506** (0.0247)	0.0067 (0.0594)	0.0304 (0.0817)
X Age 65 & over	0.0065 (0.0093)	0.0022 (0.0177)	0.0031 (0.0128)	0.0070 (0.0214)	-0.1665*** (0.0515)	-0.2332*** (0.0708)
Summary statistics: <u>4</u> /						
R ²	.029	.035	.048	.053	.128	.116
F-INCOME	2.788*	4.959**	35.842***	52.333***	.225	16.721***
F-AGE STRUCTURE	1.542	1.005	1.874*	2.196*	24.790***	22.647***
F-REGION	33.146***	48.229***	41.274***	44.836***	17.169***	5.882***

See footnotes at end of table.

Appendix table 9--Spring 1965 Household Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Pork, fresh		Pork, processed		Bacon and sausage	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.3767*** (0.0403)	0.5211*** (0.0509)	0.4769*** (0.0444)	0.7305*** (0.0673)	0.2760*** (0.0277)	0.3759*** (0.0345)
Northcentral	0.0967*** (0.0226)	0.0808*** (0.0285)	0.0421* (0.0249)	-0.0401 (0.0377)	0.1106*** (0.0155)	0.1002*** (0.0193)
South	-0.0333 (0.0223)	-0.0783*** (0.0282)	0.0147 (0.0246)	-0.0666* (0.0373)	0.1967*** (0.0153)	0.1929*** (0.0191)
West	-0.0196 (0.0274)	-0.0452 (0.0346)	-0.0358 (0.0302)	-0.1436*** (0.0458)	0.0942*** (0.0188)	0.0868*** (0.0235)
Rural	-0.0105 (0.0172)	-0.0485** (0.0217)	0.0822*** (0.0190)	0.0334 (0.0287)	0.0781*** (0.0118)	0.0612*** (0.0147)
Black	0.0757*** (0.0264)	0.0829** (0.0334)	0.0878*** (0.0291)	-0.0149 (0.0441)	0.1214*** (0.0181)	0.1130*** (0.0226)
Income <u>2</u> /	-0.0120 (0.0358)	0.0493 (0.0452)	0.0609 (0.0395)	0.2326*** (0.0598)	-0.0223 (0.0246)	0.0517* (0.0307)
Income squared <u>3</u> /	0.0792 (0.0891)	-0.0596 (0.1126)	-0.1487 (0.0983)	-0.5173*** (0.1488)	0.0562 (0.0612)	-0.0746 (0.0764)
Household size (Inverse)	0.0193 (0.0508)	0.0167 (0.0642)	-0.2665*** (0.0560)	-0.2890*** (0.0848)	0.0367 (0.0349)	0.0367 (0.0435)
Guest meals	0.0120*** (0.0014)	0.0147*** (0.0018)	0.0321*** (0.0016)	0.0439*** (0.0024)	0.0190*** (0.0010)	0.0243*** (0.0012)
\bar{X} Age 0-2	-0.1709* (0.0983)	-0.2819** (0.1242)	-0.3929*** (0.1085)	-0.5347*** (0.1642)	-0.3283*** (0.0675)	-0.4454*** (0.0843)
\bar{X} Age 3-12	-0.2503*** (0.0494)	-0.3318*** (0.0624)	-0.3956*** (0.0544)	-0.5114*** (0.0824)	-0.2338*** (0.0339)	-0.2930*** (0.0423)
\bar{X} Age 13-19	-0.0991* (0.0587)	-0.1602** (0.0742)	-0.2252*** (0.0648)	-0.2710*** (0.0981)	-0.1225*** (0.0403)	-0.1425*** (0.0503)
\bar{X} Age 20-39	0.1075*** (0.0351)	0.1381*** (0.0443)	-0.0872** (0.0387)	-0.0939 (0.0585)	-0.0136 (0.0241)	-0.0139 (0.0300)
\bar{X} Age 65 & over	-0.1356*** (0.0304)	-0.2039*** (0.0384)	-0.0096 (0.0335)	-0.0061 (0.0507)	-0.0213 (0.0209)	-0.0231 (0.0260)
Summary statistics: <u>4</u> /						
R ²	.026	.029	.074	.063	.114	.103
F-INCOME	.042	1.410	2.282	15.099***	.780	3.243*
F-AGE STRUCTURE	11.415***	13.786***	13.871***	10.031***	12.532***	13.376***
F-REGION	15.822***	13.943***	2.606**	3.501**	55.296***	34.488***

See footnotes at end of table.

Appendix table 9--Spring 1965 Household Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Poultry		Chicken		Chicken, whole	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.8240*** (0.0634)	0.5914*** (0.0468)	0.7640*** (0.0595)	0.5445*** (0.0434)	0.6250*** (0.0562)	0.4115*** (0.0365)
Northcentral	-0.1460*** (0.0355)	-0.1969*** (0.0262)	-0.1070*** (0.0333)	-0.1685*** (0.0243)	0.0245 (0.0315)	-0.0263 (0.0204)
South	-0.0389 (0.0352)	-0.1479*** (0.0259)	0.0098 (0.0330)	-0.1164*** (0.0241)	0.1285*** (0.0312)	0.0169 (0.0202)
West	-0.0953** (0.0431)	-0.1189*** (0.0318)	-0.0725* (0.0405)	-0.1110*** (0.0295)	0.0668* (0.0382)	0.0214 (0.0248)
Rural	-0.0226 (0.0271)	-0.0468** (0.0200)	-0.0073 (0.0254)	-0.0302 (0.0185)	0.0565** (0.0240)	0.0312** (0.0156)
Black	0.4358*** (0.0416)	0.2193*** (0.0307)	0.4269*** (0.0390)	0.2154*** (0.0285)	0.3949*** (0.0369)	0.2357*** (0.0239)
Income <u>2/</u>	0.1999*** (0.0564)	0.2773*** (0.0416)	0.1252** (0.0529)	0.2074*** (0.0386)	0.0083 (0.0500)	0.0541* (0.0324)
Income squared <u>3/</u>	-0.5893*** (0.1402)	-0.6232*** (0.1035)	-0.4222*** (0.1315)	-0.4714*** (0.0960)	-0.1957 (0.1243)	-0.2213*** (0.0807)
Household size (Inverse)	0.2076*** (0.0799)	0.2197*** (0.0590)	0.2513*** (0.0750)	0.2622*** (0.0547)	0.0417 (0.0709)	0.0460 (0.0460)
Guest meals	0.0524*** (0.0023)	0.0328*** (0.0017)	0.0448*** (0.0021)	0.0272*** (0.0016)	0.0415*** (0.0020)	0.0243*** (0.0013)
% Age 0-2	-0.5037*** (0.1548)	-0.3006*** (0.1142)	-0.5361*** (0.1452)	-0.3166*** (0.1059)	-0.5070*** (0.1372)	-0.3159*** (0.0890)
% Age 3-12	-0.3505*** (0.0777)	-0.2305*** (0.0573)	-0.3583*** (0.0729)	-0.2191*** (0.0532)	-0.3521*** (0.0689)	-0.2130*** (0.0447)
% Age 13-19	-0.1560* (0.0924)	-0.0730 (0.0682)	-0.2078** (0.0867)	-0.1058* (0.0633)	-0.2545*** (0.0819)	-0.1582*** (0.0532)
% Age 20-39	-0.1083** (0.0552)	-0.0356 (0.0407)	-0.1014** (0.0517)	-0.0376 (0.0378)	-0.1690*** (0.0489)	-0.1123*** (0.0317)
% Age 65 & over	-0.0196 (0.0478)	-0.0224 (0.0353)	-0.0394 (0.0448)	-0.0364 (0.0327)	-0.0204 (0.0424)	-0.0082 (0.0275)
Summary statistics: <u>4/</u>						
R ²	.111	.101	.105	.093	.096	.081
F-INCOME	10.996***	44.222***	4.513**	28.592***	.022	1.927
F-AGE STRUCTURE	7.128***	4.691***	7.965***	4.969***	10.739***	10.180***
F-REGION	6.816***	19.530***	6.426***	16.268***	7.231***	2.354*

See footnotes at end of table.

Appendix table 9--Spring 1965 Household Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Chicken, parts		Chicken, processed		Turkey	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.1379*** (0.0284)	0.1185*** (0.0268)	0.0011 (0.0115)	0.0145 (0.0152)	0.0508** (0.0235)	0.0382** (0.0182)
Northcentral	-0.1144*** (0.0159)	-0.1144*** (0.0150)	-0.0171*** (0.0065)	-0.0278*** (0.0085)	-0.0449*** (0.0131)	-0.0319*** (0.0102)
South	-0.1053*** (0.0158)	-0.1100*** (0.0149)	-0.0134** (0.0064)	-0.0233*** (0.0084)	-0.0501*** (0.0130)	-0.0318*** (0.0101)
West	-0.1368*** (0.0193)	-0.1276*** (0.0183)	-0.0024 (0.0078)	-0.0049 (0.0103)	-0.0228 (0.0160)	-0.0070 (0.0124)
Rural	-0.0696*** (0.0121)	-0.0637*** (0.0115)	0.0057 (0.0049)	0.0024 (0.0065)	-0.0197** (0.0100)	-0.0187** (0.0078)
Black	0.0391** (0.0186)	-0.0063 (0.0176)	-0.0072 (0.0075)	-0.0140 (0.0099)	0.0104 (0.0154)	0.0054 (0.0120)
Income ^{2/}	0.1034*** (0.0253)	0.1319*** (0.0239)	0.0135 (0.0102)	0.0214 (0.0135)	0.0693*** (0.0209)	0.0684*** (0.0162)
Income squared ^{3/}	-0.2044*** (0.0628)	-0.2350*** (0.0594)	-0.0222 (0.0255)	-0.0152 (0.0336)	-0.1589*** (0.0519)	-0.1494*** (0.0403)
Household size (Inverse)	0.1607*** (0.0358)	0.1609*** (0.0338)	0.0488*** (0.0145)	0.0553*** (0.0191)	-0.0307 (0.0296)	-0.0335 (0.0230)
Guest meals	0.0024** (0.0010)	0.0019** (0.0010)	0.0009** (0.0004)	0.0009* (0.0005)	0.0078*** (0.0008)	0.0057*** (0.0007)
% Age 0-2	-0.0307 (0.0694)	-0.0298 (0.0655)	0.0016 (0.0281)	0.0292 (0.0370)	0.0335 (0.0573)	0.0124 (0.0445)
% Age 3-12	0.0035 (0.0348)	0.0175 (0.0329)	-0.0097 (0.0141)	-0.0235 (0.0186)	0.0185 (0.0287)	-0.0017 (0.0223)
% Age 13-19	0.0452 (0.0414)	0.0602 (0.0391)	0.0015 (0.0168)	-0.0078 (0.0221)	0.0726** (0.0342)	0.0480* (0.0266)
% Age 20-39	0.0358 (0.0247)	0.0364 (0.0234)	0.0317*** (0.0100)	0.0382*** (0.0132)	-0.0032 (0.0204)	0.0033 (0.0159)
% Age 65 & over	-0.0044 (0.0214)	-0.0058 (0.0202)	-0.0146* (0.0087)	-0.0224* (0.0114)	0.0206 (0.0177)	0.0160 (0.0137)
Summary statistics: ^{4/}						
R ²	.032	.037	.008	.011	.017	.017
F-INCOME	17.469***	32.937***	1.934	3.251*	10.888***	1.024
F-AGE STRUCTURE	.685	1.015	3.671***	4.260***	1.192	1.024
F-REGION	24.364***	26.557***	3.004**	4.649***	5.786***	4.808***

See footnotes at end of table.

Appendix table 9--Spring 1965 Household Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Turkey, whole		Turkey, parts		Poultry, other	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.0452** (0.0219)	0.0321** (0.0148)	0.0056 (0.0086)	0.0062 (0.0108)	0.0092* (0.0053)	0.0087** (0.0037)
Northcentral	-0.0385*** (0.0123)	-0.0231*** (0.0083)	-0.0063 (0.0048)	-0.0088 (0.0061)	0.0058** (0.0029)	0.0035* (0.0021)
South	-0.0447*** (0.0122)	-0.0257*** (0.0082)	-0.0054 (0.0048)	-0.0061 (0.0060)	0.0014 (0.0029)	0.0004 (0.0021)
West	-0.0345** (0.0149)	-0.0188* (0.0101)	0.0117** (0.0058)	0.0118 (0.0074)	-0.0001 (0.0036)	-0.0009 (0.0025)
Rural	-0.0160* (0.0094)	-0.0117* (0.0063)	-0.0038 (0.0037)	-0.0071 (0.0046)	0.0045** (0.0022)	0.0021 (0.0016)
Black	-0.0027 (0.0144)	-0.0030 (0.0097)	0.0131** (0.0056)	0.0085 (0.0071)	-0.0014 (0.0034)	-0.0015 (0.0024)
Income 2/	0.0480** (0.0195)	0.0331** (0.0131)	0.0213*** (0.0076)	0.0353*** (0.0096)	0.0054 (0.0047)	0.0015 (0.0033)
Income squared 3/	-0.1136** (0.0485)	-0.0788** (0.0327)	-0.0453** (0.0190)	-0.0706*** (0.0239)	-0.0082 (0.0116)	-0.0023 (0.0083)
Household size (Inverse)	-0.0295 (0.0277)	-0.0271 (0.0186)	-0.0012 (0.0108)	-0.0064 (0.0136)	-0.0130** (0.0066)	-0.0089* (0.0047)
Guest meals	0.0068*** (0.0008)	0.0047*** (0.0005)	0.0010*** (0.0003)	0.0010*** (0.0004)	-0.0002 (0.0002)	-0.0001 (0.0001)
% Age 0-2	0.0338 (0.0536)	0.0196 (0.0361)	-0.0003 (0.0209)	-0.0072 (0.0264)	-0.0011 (0.0128)	0.0036 (0.0091)
% Age 3-12	0.0166 (0.0269)	0.0032 (0.0181)	0.0020 (0.0105)	-0.0049 (0.0132)	-0.0106* (0.0064)	-0.0098** (0.0046)
% Age 13-19	0.0749** (0.0320)	0.0401* (0.0216)	-0.0023 (0.0125)	0.0079 (0.0158)	-0.0208*** (0.0077)	-0.0151*** (0.0054)
% Age 20-39	0.0015 (0.0191)	-0.0006 (0.0129)	-0.0047 (0.0075)	0.0038 (0.0094)	-0.0037 (0.0046)	-0.0012 (0.0032)
% Age 65 & over	0.0169 (0.0165)	0.0137 (0.0111)	0.0037 (0.0065)	0.0023 (0.0081)	-0.0007 (0.0040)	-0.0020 (0.0028)
Summary statistics: 4/						
R ²	.014	.014	.006	.006	.003	.003
F-INCOME	5.894**	6.178**	7.917***	13.981***	1.524	.245
F-AGE STRUCTURE	1.280	1.065	.213	.161	1.697	2.159*
F-REGION	4.992***	3.718**	4.003	3.171**	1.801	1.620

See footnotes at end of table.

Appendix table 9--Spring 1965 Household Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Fish and shellfish		Fish		Shellfish	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.3895*** (0.0440)	0.6438*** (0.0557)	0.3373*** (0.0419)	0.5273*** (0.0493)	0.0522*** (0.0125)	0.1165*** (0.0262)
Northcentral	-0.1099*** (0.0247)	-0.2521*** (0.0312)	-0.0670*** (0.0235)	-0.1545*** (0.0276)	-0.0429*** (0.0070)	-0.0976*** (0.0147)
South	0.0514** (0.0244)	-0.0843*** (0.0309)	0.0630*** (0.0233)	-0.0443 (0.0273)	-0.0116* (0.0069)	-0.0400*** (0.0146)
West	-0.0850*** (0.0299)	-0.1608*** (0.0379)	-0.0556* (0.0285)	-0.0997*** (0.0335)	-0.0294*** (0.0085)	-0.0611*** (0.0179)
Rural	0.0385** (0.0188)	-0.0354 (0.0238)	0.0531*** (0.0179)	0.0068 (0.0210)	-0.0146*** (0.0053)	-0.0422*** (0.0112)
Black	0.2800*** (0.0289)	0.1890*** (0.0365)	0.2870*** (0.0275)	0.2143*** (0.0323)	-0.0070 (0.0082)	-0.0253 (0.0172)
Income <u>2/</u>	0.0439 (0.0391)	0.2572*** (0.0495)	-0.0214 (0.0373)	0.0670 (0.0438)	0.0653*** (0.0111)	0.1902*** (0.0233)
Income squared <u>3/</u>	-0.0235 (0.0974)	-0.4034*** (0.1232)	0.1047 (0.0928)	-0.0216 (0.1090)	-0.1282*** (0.0277)	-0.3818*** (0.0580)
Household size (Inverse)	-0.0088 (0.0555)	0.0192 (0.0702)	0.0110 (0.0529)	0.0486 (0.0621)	-0.0198 (0.0158)	-0.0294 (0.0331)
Guest meals	0.0254*** (0.0016)	0.0306*** (0.0020)	0.0230*** (0.0015)	0.0255*** (0.0018)	0.0024*** (0.0004)	0.0051*** (0.0009)
■ Age 0-2	-0.3555*** (0.1075)	-0.4739*** (0.1359)	-0.3110*** (0.1024)	-0.3892*** (0.1203)	-0.0445 (0.0305)	-0.0847 (0.0641)
■ Age 3-12	-0.2185*** (0.0539)	-0.2915*** (0.0682)	-0.2217*** (0.0514)	-0.2636*** (0.0604)	0.0031 (0.0153)	-0.0279 (0.0322)
■ Age 13-19	-0.1454** (0.0642)	-0.1673** (0.0812)	-0.1308** (0.0612)	-0.1444** (0.0718)	-0.0146 (0.0182)	-0.0229 (0.0383)
■ Age 20-39	-0.0299 (0.0383)	-0.0173 (0.0484)	-0.0362 (0.0365)	-0.0397 (0.0429)	0.0064 (0.0109)	0.0224 (0.0228)
■ Age 65 & over	-0.0378 (0.0332)	-0.0945** (0.0420)	-0.0236 (0.0316)	-0.0474 (0.0371)	-0.0142 (0.0094)	-0.0471** (0.0198)
Summary statistics: <u>4/</u>						
R ²	.068	.066	.066	.055	.019	.030
F-INCOME	1.667	30.204***	.190	3.197*	36.076***	68.968***
F-AGE STRUCTURE	4.930***	5.644***	5.211***	5.479***	1.151	1.854*
F-REGION	20.664***	24.656***	14.548***	12.362***	15.249***	15.700***

See footnotes at end of table.

Appendix table 9--Spring 1965 Household Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Franks		Luncheon meats		Variety meats	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.1317*** (0.0158)	0.1630*** (0.0169)	0.2585*** (0.0200)	0.4285*** (0.0291)	0.0905*** (0.0214)	0.1138*** (0.0192)
Northcentral	-0.0085 (0.0089)	-0.0350*** (0.0095)	0.0513*** (0.0112)	0.0064 (0.0163)	-0.0196 (0.0120)	-0.0327*** (0.0108)
South	-0.0530*** (0.0088)	-0.0862*** (0.0094)	-0.0305*** (0.0111)	-0.1169*** (0.0161)	-0.0101 (0.0119)	-0.0264*** (0.0107)
West	-0.0342*** (0.0108)	-0.0631*** (0.0115)	-0.0312** (0.0136)	-0.0926*** (0.0198)	-0.0006 (0.0146)	-0.0100 (0.0131)
Rural	0.0087 (0.0068)	0.0035 (0.0072)	-0.0072 (0.0085)	-0.0363*** (0.0124)	-0.0086 (0.0091)	-0.0222*** (0.0082)
Black	0.0328*** (0.0104)	0.0204* (0.0111)	-0.0114 (0.0131)	-0.0628*** (0.0191)	0.2252*** (0.0140)	0.1050*** (0.0126)
Income <u>2/</u>	0.0009 (0.0141)	0.0190 (0.0150)	-0.0461*** (0.0178)	-0.0142 (0.0259)	-0.0146 (0.0190)	0.0065 (0.0171)
Income squared <u>3/</u>	-0.0152 (0.0350)	-0.0512 (0.0374)	0.0575 (0.0442)	-0.0306 (0.0643)	0.0311 (0.0474)	0.0443 (0.0426)
Household size (Inverse)	0.0284 (0.0200)	0.0351* (0.0213)	0.0074 (0.0252)	0.0041 (0.0367)	0.0723*** (0.0270)	0.0285 (0.0243)
Guest meals	0.0078*** (0.0006)	0.0081*** (0.0006)	0.0088*** (0.0007)	0.0112*** (0.0010)	0.0059*** (0.0008)	0.0057*** (0.0007)
% Age 0-2	0.0482 (0.0387)	0.0355 (0.0412)	-0.0830* (0.0488)	-0.1443** (0.0710)	-0.0584 (0.0523)	-0.0530 (0.0470)
% Age 3-12	0.0758*** (0.0194)	0.0720*** (0.0207)	-0.0392 (0.0245)	-0.0822** (0.0356)	-0.0661** (0.0262)	-0.0625*** (0.0236)
% Age 13-19	0.0784*** (0.0231)	0.0670*** (0.0246)	0.0552* (0.0292)	0.0628 (0.0424)	-0.0619** (0.0312)	-0.0824*** (0.0281)
% Age 20-39	0.0202 (0.0138)	0.0187 (0.0147)	0.0527*** (0.0174)	0.0854*** (0.0253)	-0.0113 (0.0186)	-0.0340*** (0.0167)
% Age 65 & over	-0.0616*** (0.0119)	-0.0713*** (0.0127)	-0.1091*** (0.0151)	-0.1457*** (0.0219)	-0.0556*** (0.0161)	-0.0495*** (0.0145)
Summary statistics: <u>4/</u>						
R ²	.043	.045	.044	.045	.050	.031
F-INCOME	.001	1.475	7.941***	.585	.602	.473
F-AGE STRUCTURE	13.236***	12.914***	17.748***	16.390***	3.299***	3.984***
F-REGION	16.515***	31.378***	26.428***	32.640***	1.106	3.605**

Appendix Table 9--Spring 1965 Household Food Consumption Survey,
Meat consumption regression equations

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- 1/ The quantity and money value of meat are measured respectively in pounds per week and dollars per week of food used from home supplies. Sample means of the independent variables are: North Central, 0.2968; South, 0.3533; West, 0.1358; Rural, 0.4230; Black, 0.1095; Income, 4,589; Income Squared 53,862,000; Household Size (inverse), 0.3936; Guest Meals (per person), 1.8313; Percent Age 0-2, 0.0315; Percent Age 3-12, 0.1645; Percent Age 13-19, 0.1019; Percent Age 20-39, 0.2044; Percent Age 65 and over, 0.1630. *** denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 1% level. Numbers in parentheses are standard errors of the parameter estimates.
- 2/ The coefficient on income and its standard error have been multiplied by a factor of 10^3 for convenience in presentation.
- 3/ The coefficient on Income Squared and its standard error are multiplied by a factor of 10^9 for convenience in presentation.
- 4/ R^2 is the coefficient of determination. "F" in F-Urbanization, F-Region, etc., denotes Fisher's F-test statistic which is used to test for significant differences within each reported category. The "*" denotes significance levels.

Appendix table 10--Spring 1977 Nationwide Food Consumption Survey, meat consumption regression equations 1/

Item	Total Meats		Red Meats		Beef	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	4.5950*** (0.3182)	5.2868*** (0.3932)	2.9134*** (0.2182)	3.4679*** (0.3014)	1.7433*** (0.1659)	2.0882*** (0.2284)
Northcentral	0.1641 (0.1769)	-0.5905*** (0.2186)	0.3308*** (0.1213)	-0.1831 (0.1676)	0.2167** (0.0922)	-0.1779 (0.1270)
South	0.2538 (0.1747)	-0.3775* (0.2160)	0.2470** (0.1199)	-0.0793 (0.1656)	0.1650* (0.0911)	-0.0265 (0.1255)
West	-0.0848 (0.1973)	-0.4667* (0.2438)	0.1480 (0.1353)	-0.1187 (0.1869)	0.1299 (0.1029)	-0.0610 (0.1416)
Rural	0.1123 (0.1412)	-0.2928* (0.1745)	0.1734* (0.0969)	-0.0960 (0.1338)	0.0838 (0.0736)	-0.1196 (0.1014)
Black	2.2192*** (0.2041)	2.0177*** (0.2522)	0.6938*** (0.1400)	0.9325*** (0.1934)	0.1821* (0.1064)	0.2859* (0.1465)
Income 2/	0.5372 (0.4520)	2.3751*** (0.5587)	0.5144* (0.3101)	1.8729*** (0.4283)	0.7139*** (0.2357)	1.6014*** (0.3246)
Income squared 3/	-2.3545 (2.2468)	-5.7835** (2.7768)	-1.4161 (1.5412)	-4.3752** (2.1288)	-2.2325* (1.1715)	-3.7471** (1.6132)
Household size (Inverse)	0.3142 (0.3213)	0.5337 (0.3971)	-0.4271* (0.2204)	-0.1561 (0.3044)	-0.2568 (0.1675)	-0.1194 (0.2307)
Guest meals	0.7044*** (0.0560)	0.8707*** (0.0692)	0.4803*** (0.0384)	0.6603*** (0.0531)	0.2481*** (0.0292)	0.3640*** (0.0402)
% Age 0-2	-3.2324*** (0.7064)	-3.6785*** (0.8730)	-2.4549*** (0.8445)	-2.7011*** (0.6693)	-1.2675*** (0.3683)	-1.3368*** (0.5072)
% Age 3-12	-2.2151*** (0.4090)	-2.1960*** (0.5055)	-1.5010*** (0.2806)	-1.5617*** (0.3876)	-0.8140*** (0.2133)	-0.9187*** (0.2937)
% Age 13-19	-1.6426*** (0.4261)	-1.7121*** (0.5267)	-1.2285*** (0.2923)	-1.3106*** (0.4038)	-0.6614*** (0.2222)	-0.8002*** (0.3060)
% Age 20-39	-1.1775*** (0.2211)	-1.3559*** (0.2732)	-0.6381*** (0.1516)	-0.9053*** (0.2095)	-0.4009*** (0.1153)	-0.6432*** (0.1587)
% Age 65 & over	-0.9999*** (0.2325)	-1.2887*** (0.2873)	-0.4936*** (0.1595)	-0.7509*** (0.2203)	-0.3536*** (0.1212)	-0.5843*** (0.1669)
Summary statistics: 4/						
R ²	0.170	0.174	0.129	0.143	0.076	0.104
F-Income	1.283	27.312***	3.859**	29.563***	11.737***	37.606***
F-Age Structure	14.730***	11.967***	13.052***	9.630***	7.119***	6.559***
F-Region	1.365	2.586*	2.690**	0.417	1.956	0.821

See footnotes at end of table.

continued--

Appendix table 10--Spring 1977 Nationwide Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Steaks (loin and rib)		Roasts (loin and rib)		Steaks (Round and chuck)	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.2093*** (0.0741)	0.2672* (0.1377)	0.0499** (0.0243)	0.0809** (0.0385)	0.3629*** (0.0603)	0.4761*** (0.0797)
Northcentral	0.0261 (0.0412)	-0.0463 (0.0765)	-0.0193 (0.0135)	-0.0372* (0.0214)	-0.0488 (0.0335)	-0.1188*** (0.0443)
South	0.0259 (0.0407)	0.0011 (0.0756)	-0.0033 (0.0133)	-0.0122 (0.0212)	-0.0388 (0.0331)	-0.0668 (0.0438)
West	0.0232 (0.0460)	0.0388 (0.0854)	0.0118 (0.0151)	0.0041 (0.0239)	-0.0103 (0.0374)	-0.0425 (0.0494)
Rural	-0.0159 (0.0329)	-0.0995 (0.0611)	0.0001 (0.0108)	-0.0129 (0.0171)	-0.0089 (0.0268)	-0.0294 (0.0354)
Black	0.0612 (0.0476)	0.0908 (0.0883)	0.0002 (0.0156)	-0.0061 (0.0247)	0.0313 (0.0387)	0.0554 (0.0511)
Income <u>2/</u>	0.4494*** (0.1053)	0.9840*** (0.1956)	0.0226 (0.0345)	0.0626 (0.0547)	-0.0196 (0.0857)	-0.0122 (0.1133)
Income squared <u>3/</u>	-0.8737* (0.5236)	-1.6656* (0.9722)	-0.0910 (0.1715)	-0.2364 (0.2720)	0.0509 (0.4260)	0.1620 (0.5629)
Household size (Inverse)	-0.0286 (0.0749)	0.0612 (0.1390)	-0.0461* (0.0245)	-0.0727* (0.0389)	-0.0478 (0.0609)	-0.0501 (0.0805)
Guest meals	0.0837*** (0.0131)	0.1528*** (0.0242)	0.0054 (0.0043)	0.0125* (0.0068)	0.0066 (0.0106)	0.0168 (0.0140)
% Age 0-2	-0.1785 (0.1646)	-0.1488 (0.3056)	-0.0701 (0.0539)	-0.0919 (0.0855)	-0.1240 (0.1339)	-0.1283 (0.1770)
% Age 3-12	-0.1346 (0.0953)	-0.1243 (0.1770)	-0.0586* (0.0312)	-0.0784 (0.0495)	-0.1546** (0.0775)	-0.1951* (0.1025)
% Age 13-19	-0.1416 (0.0993)	-0.1542 (0.1844)	-0.0182 (0.0325)	-0.0322 (0.0516)	-0.0265 (0.0808)	-0.0351 (0.1068)
% Age 20-39	-0.1328*** (0.0515)	-0.2558*** (0.0957)	-0.0034 (0.0169)	-0.0238 (0.0268)	-0.0540 (0.0419)	-0.0565 (0.0554)
% Age 65 & over	-0.2479*** (0.0542)	-0.4023*** (0.1006)	0.0171 (0.0177)	0.0199 (0.0281)	0.0125 (0.0441)	0.0092 (0.0582)
Summary statistics: <u>4/</u>						
R ²	0.068	0.079	0.007	0.009	0.006	0.009
F-Income	30.702***	45.080***	0.434	1.413	0.077	0.001
F-Age Structure	4.451***	3.504***	1.468	1.364	1.753	1.309
F-Region	0.177	0.382	1.659	1.475	0.908	2.499*

See footnotes at end of table.

Appendix table 10--Spring 1977 Nationwide Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Roasts(round and chuck)		Beef, ground		Beef, other	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.4457*** (0.0899)	0.5569*** (0.1140)	0.5854*** (0.0702)	0.6378*** (0.0721)	0.0901* (0.0466)	0.0694 (0.0479)
Northcentral	0.0946* (0.0500)	-0.0093 (0.0634)	0.1593*** (0.0390)	0.0546 (0.0401)	0.0047 (0.0259)	-0.0208 (0.0266)
South	0.1036** (0.0494)	0.0647 (0.0626)	0.0609 (0.0385)	-0.0105 (0.0396)	0.0167 (0.0256)	-0.0028 (0.0263)
West	-0.0048 (0.0557)	-0.0594 (0.0707)	0.0468 (0.0435)	-0.0526 (0.0447)	0.0633** (0.0289)	0.0506* (0.0297)
Rural	0.0686* (0.0399)	0.0485 (0.0506)	0.0310 (0.0312)	-0.0297 (0.0320)	0.0089 (0.0207)	0.0034 (0.0213)
Black	0.1048* (0.0576)	0.1468** (0.0731)	-0.0794* (0.0450)	-0.0554 (0.0462)	0.0641** (0.0299)	0.0544* (0.0307)
Income <u>2</u> /	0.3968*** (0.1277)	0.5912*** (0.1620)	-0.1434 (0.0997)	-0.1136 (0.1024)	0.0082 (0.0662)	0.0894 (0.0681)
Income squared <u>3</u> /	-1.7418*** (0.6347)	-2.3864*** (0.8051)	0.5661 (0.4956)	0.7086 (0.5089)	-0.1431 (0.3289)	-0.3293 (0.3383)
Household size (Inverse)	-0.1406 (0.0908)	-0.1248 (0.1151)	-0.0350 (0.0709)	-0.0129 (0.0728)	0.0413 (0.0470)	0.0800* (0.0484)
Guest meals	0.0762*** (0.0158)	0.0966*** (0.0201)	0.0687*** (0.0124)	0.0793*** (0.0127)	0.0075 (0.0082)	0.0061 (0.0084)
% Age 0-2	-0.5266*** (0.1995)	-0.5619** (0.2531)	-0.2346 (0.1558)	-0.3056* (0.1600)	-0.1337 (0.1034)	-0.1003 (0.1064)
% Age 3-12	-0.3973*** (0.1156)	-0.4710*** (0.1466)	0.0317 (0.0902)	0.0102 (0.0926)	-0.1006* (0.0599)	-0.0601 (0.0616)
% Age 13-19	-0.4120*** (0.1204)	-0.5146*** (0.1527)	-0.0311 (0.0940)	-0.0727 (0.0965)	-0.0320 (0.0624)	0.0086 (0.0642)
% Age 20-39	-0.2976*** (0.0625)	-0.3778*** (0.0792)	0.0932* (0.0488)	0.0634 (0.0501)	-0.0063 (0.0324)	0.0073 (0.0333)
% Age 65 & over	-0.0791 (0.0657)	-0.1829** (0.0833)	-0.0736 (0.0513)	-0.0576 (0.0527)	0.0174 (0.0340)	0.0294 (0.0350)
Summary statistics: <u>4</u> /						
R ²	0.053	0.051	0.033	0.028	0.012	0.015
F-Income	8.751***	13.383***	2.131	0.587	0.013	1.909
F-Age Structure	8.838***	7.541***	2.445**	1.663	1.034	0.628
F-Region	2.563*	1.208	6.054**	2.266*	1.952	2.148*

See footnotes at end of table.

Appendix table 10—Spring 1977 Nationwide Food Consumption Survey, meat consumption regression equations 1/—continued

Item	Veal		Lamb, mutton, goat		Pork	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.0442** (0.0215)	0.1096*** (0.0346)	0.0327 (0.0255)	0.0541 (0.0457)	1.0933*** (0.1206)	1.2159*** (0.1609)
Northcentral	-0.0404*** (0.0120)	-0.0956*** (0.0192)	-0.0157 (0.0142)	-0.0324 (0.0254)	0.1703** (0.0671)	0.1228 (0.0894)
South	-0.0208* (0.0118)	-0.0714*** (0.0190)	-0.0399*** (0.0140)	-0.0737*** (0.0251)	0.1427** (0.0663)	0.0924 (0.0884)
West	-0.0288** (0.0133)	-0.0737*** (0.0215)	0.0410*** (0.0158)	0.0476* (0.0283)	0.0059 (0.0748)	-0.0315 (0.0997)
Rural	-0.0221** (0.0096)	-0.0420*** (0.0154)	0.0008 (0.0113)	-0.0042 (0.0203)	0.1110** (0.0535)	0.0698 (0.0714)
Black	0.0643*** (0.0138)	0.0840*** (0.0222)	0.0328** (0.0164)	0.0585** (0.0293)	0.4147*** (0.0774)	0.5041*** (0.1032)
Income 2/	0.0429 (0.0306)	0.0937* (0.0492)	0.0570 (0.0363)	0.1389** (0.0649)	-0.2994* (0.1714)	0.0389 (0.2286)
Income squared 3/	-0.1192 (0.1521)	-0.2700 (0.2445)	-0.1818 (0.1804)	-0.5146 (0.3224)	1.1174 (0.8520)	0.1565 (1.1362)
Household size (Inverse)	0.0088 (0.0217)	0.0055 (0.0350)	0.0011 (0.0258)	-0.0018 (0.0461)	-0.1802 (0.1218)	-0.0404 (0.1625)
Guest meals	0.0012 (0.0038)	-0.0014 (0.0061)	-0.0048 (0.0045)	-0.0117 (0.0080)	0.2357*** (0.0212)	0.3094*** (0.0283)
% Age 0-2	-0.0309 (0.0478)	-0.0660 (0.0769)	-0.0251 (0.0567)	-0.0332 (0.1014)	-1.1314*** (0.2679)	-1.2651*** (0.3572)
% Age 3-12	-0.0258 (0.0277)	-0.0446 (0.0445)	0.0124 (0.0328)	0.0156 (0.0587)	-0.6736*** (0.1551)	-0.6140*** (0.2069)
% Age 13-19	-0.0176 (0.0288)	-0.0562 (0.0464)	-0.0123 (0.0342)	-0.0204 (0.0612)	-0.5373*** (0.1616)	-0.4338** (0.2155)
% Age 20-39	-0.0096 (0.0150)	-0.0217 (0.0241)	-0.0331* (0.0177)	-0.0530* (0.0317)	-0.1945** (0.0838)	-0.1873* (0.1118)
% Age 65 & over	0.0053 (0.0157)	-0.0086 (0.0253)	0.0022 (0.0187)	0.0114 (0.0334)	-0.1474* (0.0882)	-0.1694 (0.1176)
Summary statistics: 4/						
R ²	0.027	0.033	0.020	0.018	0.097	0.084
F-Income	2.747*	4.936**	3.111*	5.043**	3.336*	0.133
F-Age Structure	0.493	0.557	1.070	0.948	7.479***	4.278***
F-Region	3.955***	8.906***	9.789***	7.224***	3.328**	1.216

See footnotes at end of table.

Appendix table 10--Spring 1977 Nationwide Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Pork, fresh		Pork, processed		Bacon and Sausage	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.4195*** (0.0629)	0.4638*** (0.0838)	0.3693*** (0.0788)	0.3994*** (0.1031)	0.3045*** (0.0515)	0.3528*** (0.0717)
Northcentral	0.0243 (0.0350)	-0.0427 (0.0466)	0.0677 (0.0438)	0.0748 (0.0573)	0.0784*** (0.0286)	0.0906** (0.0399)
South	-0.0337 (0.0346)	-0.0655 (0.0460)	-0.0064 (0.0433)	-0.0376 (0.0566)	0.1828*** (0.0283)	0.1955*** (0.0394)
West	-0.0381 (0.0390)	-0.0538 (0.0519)	-0.0393 (0.0488)	-0.0677 (0.0639)	0.0833*** (0.0319)	0.0900** (0.0445)
Rural	0.0231 (0.0279)	0.0262 (0.0372)	0.0417 (0.0350)	0.0068 (0.0458)	0.0463** (0.0229)	0.0367 (0.0318)
Black	0.2328*** (0.0404)	0.2880*** (0.0537)	0.0306 (0.0505)	0.0163 (0.0661)	0.1513*** (0.0330)	0.1998*** (0.0460)
Income <u>2/</u>	-0.1999** (0.0894)	-0.1413 (0.1191)	-0.0465 (0.1119)	0.1734 (0.1465)	-0.0531 (0.0732)	0.0067 (0.1019)
Income squared <u>3/</u>	0.9013** (0.4444)	0.5746 (0.5917)	0.4232 (0.5564)	0.0279 (0.7280)	-0.2071 (0.3636)	-0.4459 (0.5064)
Household size (Inverse)	-0.0107 (0.0636)	0.1019 (0.0846)	-0.1806** (0.0796)	-0.1769* (0.1041)	0.0111 (0.0520)	0.0346 (0.0724)
Guest meals	0.0563*** (0.0111)	0.0875*** (0.0148)	0.1458*** (0.0139)	0.1854*** (0.0181)	0.0336*** (0.0091)	0.0365*** (0.0126)
% Age 0-2	-0.3312** (0.1397)	-0.3357* (0.1860)	-0.3883** (0.1749)	-0.4301* (0.2289)	-0.4119*** (0.1143)	-0.4993*** (0.1592)
% Age 3-12	-0.0997 (0.0809)	-0.0549 (0.1077)	-0.3178*** (0.1013)	-0.2760** (0.1325)	-0.2560*** (0.0662)	-0.2831*** (0.0922)
% Age 13-19	-0.1049 (0.0843)	-0.0668 (0.1122)	-0.1779* (0.1055)	-0.0796 (0.1381)	-0.2546*** (0.0690)	-0.2874*** (0.0960)
% Age 20-39	-0.0268 (0.0437)	-0.0162 (0.0582)	-0.0805 (0.0547)	-0.0777 (0.0716)	-0.0872** (0.0358)	-0.0934* (0.0498)
% Age 65 & over	-0.1643*** (0.0460)	-0.2452*** (0.0612)	0.0584 (0.0576)	0.0999 (0.0753)	-0.0415 (0.0376)	-0.0241 (0.0524)
Summary statistics: <u>4/</u>						
R ²	0.040	0.041	0.068	0.067	0.073	0.052
F-Income	4.370**	1.403	0.014	3.578*	2.838	0.267
F-Age Structure	3.479***	4.122***	4.462***	3.095***	6.574***	4.632***
F-Region	1.461	0.727	2.056	2.305*	14.364***	8.370***

See footnotes at end of table.

Appendix table 10—Spring 1977 Nationwide Food Consumption Survey, meat consumption regression equations 1/—continued

Item	Poultry		Chicken		Chicken, whole	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.7370*** (0.1176)	0.5463*** (0.0987)	0.5756*** (0.1050)	0.3845*** (0.0856)	0.4925*** (0.0956)	0.3096*** (0.0609)
Northcentral	-0.1839*** (0.0654)	-0.2580*** (0.0549)	-0.1449** (0.0584)	-0.1925*** (0.0476)	0.0355 (0.0532)	-0.0164 (0.0338)
South	-0.0585 (0.0646)	-0.1688*** (0.0542)	-0.0199 (0.0577)	-0.1109** (0.0470)	0.1251** (0.0525)	0.0409 (0.0334)
West	-0.1639** (0.0729)	-0.1636*** (0.0612)	-0.1556** (0.0651)	-0.1438*** (0.0531)	0.0231 (0.0593)	0.0064 (0.0377)
Rural	-0.0852 (0.0522)	-0.1054** (0.0438)	-0.0752 (0.0466)	-0.0877** (0.0380)	0.0244 (0.0424)	0.0237 (0.0270)
Black	0.7349*** (0.0755)	0.4959*** (0.0633)	0.6310*** (0.0674)	0.4549*** (0.0549)	0.5289*** (0.0613)	0.3823*** (0.0390)
Income <u>2</u> /	0.2909* (0.1671)	0.3929*** (0.1402)	0.2810* (0.1492)	0.3279*** (0.1216)	-0.0537 (0.1359)	-0.0091 (0.0865)
Income squared <u>3</u> /	-1.3934* (0.8308)	-1.4124** (0.6971)	-1.3988* (0.7416)	-1.1866** (0.6043)	-0.3849 (0.6753)	-0.3393 (0.4298)
Household size (Inverse)	0.2418** (0.1188)	0.2331** (0.0997)	0.3537*** (0.1061)	0.3606*** (0.0864)	0.0193 (0.0966)	0.0319 (0.0615)
Guest meals	0.1295*** (0.0207)	0.0925*** (0.0174)	0.0833*** (0.0185)	0.0530*** (0.0151)	0.0554*** (0.0168)	0.0285*** (0.0107)
% Age 0-2	-0.3946 (0.2612)	-0.2349 (0.2192)	-0.2058 (0.2332)	-0.0975 (0.1900)	-0.3660* (0.2123)	-0.1852 (0.1351)
% Age 3-12	-0.2323 (0.1512)	-0.1084 (0.1269)	-0.1679 (0.1350)	-0.0395 (0.1100)	-0.3394*** (0.1230)	-0.2026*** (0.0782)
% Age 13-19	-0.0413 (0.1576)	0.0020 (0.1322)	-0.0545 (0.1407)	0.0288 (0.1146)	-0.2270* (0.1281)	-0.1606** (0.0815)
% Age 20-39	-0.0993 (0.0817)	-0.0383 (0.0686)	-0.0769 (0.0730)	-0.0233 (0.0595)	-0.0987 (0.0664)	-0.0617 (0.0423)
% Age 65 & over	0.0542 (0.0860)	0.0589 (0.0721)	0.0719 (0.0767)	0.0381 (0.0625)	0.0402 (0.0699)	-0.0045 (0.0445)
Summary statistics: <u>4</u> /						
R ²	0.090	0.079	0.089	0.083	0.064	0.067
F-Income	2.429	8.899***	2.678	8.197***	1.049	0.552
F-Age Structure	1.906*	0.925	1.410	0.380	3.190***	2.326**
F-Region	3.416**	7.493***	3.667**	5.696***	2.262*	1.176

See footnotes at end of table.

Appendix table 10--Spring 1977 Nationwide Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Chicken, parts		Chicken, processed		Turkey	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.0654 (0.0625)	0.0347 (0.0597)	0.0176 (0.0233)	0.0401 (0.0365)	0.1459*** (0.0557)	0.1543*** (0.0492)
Northcentral	-0.1866*** (0.0347)	-0.1754*** (0.0332)	0.0061 (0.0129)	-0.0007 (0.0203)	-0.0356 (0.0310)	-0.0598** (0.0274)
South	-0.1328*** (0.0343)	-0.1256*** (0.0328)	-0.0122 (0.0128)	-0.0262 (0.0201)	-0.0355 (0.0306)	-0.0561** (0.0270)
West	-0.1590*** (0.0387)	-0.1290*** (0.0370)	-0.0197 (0.0144)	-0.0211 (0.0227)	-0.0127 (0.0346)	-0.0243 (0.0305)
Rural	-0.0948*** (0.0277)	-0.0938*** (0.0265)	-0.0048 (0.0103)	-0.0176 (0.0162)	-0.0090 (0.0247)	-0.0143 (0.0218)
Black	0.1058*** (0.0401)	0.0779** (0.0383)	-0.0037 (0.0149)	-0.0053 (0.0234)	0.1056*** (0.0358)	0.0427 (0.0316)
Income <u>2</u> /	0.2811*** (0.0888)	0.2617*** (0.0849)	0.0536 (0.0331)	0.0753 (0.0519)	0.0134 (0.0792)	0.0557 (0.0699)
Income squared <u>3</u> /	-0.9072** (0.4413)	-0.8376** (0.4218)	-0.1067 (0.1643)	-0.0097 (0.2580)	-0.0047 (0.3937)	-0.1836 (0.3475)
Household size (Inverse)	0.3248*** (0.0631)	0.3353*** (0.0603)	0.0096 (0.0235)	-0.0066 (0.0369)	-0.1104** (0.0563)	-0.1312*** (0.0497)
Guest meals	0.0164 (0.0110)	0.0144 (0.0105)	0.0115*** (0.0041)	0.0102 (0.0064)	0.0436*** (0.0098)	0.0368*** (0.0087)
% Age 0-2	0.1395 (0.1387)	0.0906 (0.1326)	0.0206 (0.0516)	-0.0029 (0.0811)	-0.1631 (0.1238)	-0.1240 (0.1093)
% Age 3-12	0.1419* (0.0803)	0.1305* (0.0768)	0.0296 (0.0299)	0.0326 (0.0470)	-0.0475 (0.0717)	-0.0622 (0.0633)
% Age 13-19	0.1562* (0.0837)	0.1532* (0.0800)	0.0163 (0.0312)	0.0361 (0.0489)	0.0085 (0.0747)	-0.0333 (0.0659)
% Age 20-39	0.0443 (0.0434)	0.0734* (0.0415)	-0.0226 (0.0162)	-0.0350 (0.0254)	-0.0149 (0.0387)	-0.0055 (0.0342)
% Age 65 & over	0.0203 (0.0457)	0.0095 (0.0436)	0.0114 (0.0170)	0.0331 (0.0267)	-0.0075 (0.0407)	0.0306 (0.0360)
Summary statistics: <u>4</u> /						
R ²	0.059	0.062	0.012	0.012	0.017	0.016
F-Income	12.510***	11.947***	4.397**	5.101**	0.066	0.776
F-Age Structure	1.159	1.625	0.961	1.466	0.574	0.759
F-Region	10.661***	9.846***	1.528	0.939	0.629	2.077*

See footnotes at end of table.

Appendix table 10--Spring 1977 Nationwide Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Turkey, whole		Turkey, parts		Poultry, other	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.0750*	0.0476	0.0709**	0.1067***	0.0155	0.0075
	(0.0453)	(0.0294)	(0.0330)	(0.0398)	(0.0111)	(0.0091)
Northcentral	-0.0113	-0.0050	-0.0243	-0.0548**	-0.0034	-0.0056
	(0.0252)	(0.0163)	(0.0183)	(0.0221)	(0.0062)	(0.0050)
South	-0.0170	-0.0111	-0.0185	-0.0450**	-0.0031	-0.0018
	(0.0249)	(0.0161)	(0.0181)	(0.0219)	(0.0061)	(0.0050)
West	-0.0214	-0.0156	0.0088	-0.0087	0.0043	0.0044
	(0.0281)	(0.0182)	(0.0204)	(0.0247)	(0.0069)	(0.0056)
Rural	-0.0101	-0.0074	0.0011	-0.0070	-0.0010	-0.0034
	(0.0201)	(0.0130)	(0.0146)	(0.0177)	(0.0049)	(0.0040)
Black	0.0288	0.0179	0.0768***	0.0247	-0.0017	-0.0017
	(0.0290)	(0.0188)	(0.0212)	(0.0255)	(0.0071)	(0.0058)
Income <u>2/</u>	-0.0375	-0.0273	0.0509	0.0829	-0.0035	0.0093
	(0.0643)	(0.0417)	(0.0469)	(0.0565)	(0.0158)	(0.0129)
Income squared <u>3/</u>	0.2686	0.2022	-0.2733	-0.3857	0.0101	-0.0422
	(0.3196)	(0.2075)	(0.2329)	(0.2810)	(0.0785)	(0.0640)
Household size (Inverse)	-0.0620	-0.0415	-0.0484	-0.0897**	-0.0015	0.0037
	(0.0457)	(0.0297)	(0.0333)	(0.0402)	(0.0112)	(0.0092)
Guest meals	0.0424***	0.0283***	0.0012	0.0085	0.0026	0.0026
	(0.0080)	(0.0052)	(0.0058)	(0.0070)	(0.0020)	(0.0016)
% Age 0-2	-0.0852	-0.0599	-0.0780	-0.0641	-0.0256	-0.0134
	(0.1005)	(0.0652)	(0.0732)	(0.0884)	(0.0247)	(0.0201)
% Age 3-12	0.0317	0.0269	-0.0792*	-0.0891*	-0.0168	-0.0067
	(0.0582)	(0.0378)	(0.0424)	(0.0512)	(0.0143)	(0.0117)
% Age 13-19	0.0359	0.0190	-0.0274	-0.0523	0.0046	0.0065
	(0.0606)	(0.0394)	(0.0442)	(0.0533)	(0.0149)	(0.0121)
% Age 20-39	-0.0162	-0.0082	0.0014	0.0027	-0.0075	-0.0095
	(0.0314)	(0.0204)	(0.0229)	(0.0277)	(0.0077)	(0.0063)
% Age 65 & over	-0.0246	-0.0142	0.0171	0.0448	-0.0102	-0.0098
	(0.0331)	(0.0215)	(0.0241)	(0.0291)	(0.0081)	(0.0066)
Summary statistics: <u>4/</u>						
R ²	0.019	0.020	0.011	0.011	0.005	0.007
F-Income	0.107	0.117	0.779	1.800	0.066	0.453
F-Age Structure	0.582	0.571	1.095	1.586	1.114	1.237
F-Region	0.239	0.306	1.273	2.804**	0.557	1.205

See footnotes at end of table.

Appendix table 10--Spring 1977 Nationwide Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Fish and shellfish		Fish		Shellfish	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.5022*** (0.1064)	0.6818*** (0.1413)	0.4210*** (0.0954)	0.6112*** (0.1160)	0.0812** (0.0406)	0.0706 (0.0716)
Northcentral	-0.0697 (0.0591)	-0.1970** (0.0785)	-0.0092 (0.0530)	-0.1115* (0.0645)	-0.0604*** (0.0226)	-0.0855** (0.0398)
South	0.0674 (0.0584)	-0.0436 (0.0776)	0.0801 (0.0524)	-0.0499 (0.0637)	-0.0127 (0.0223)	0.0063 (0.0393)
West	-0.0415 (0.0659)	-0.1086 (0.0876)	-0.0280 (0.0591)	-0.1112 (0.0719)	-0.0134 (0.0252)	0.0026 (0.0444)
Rural	0.0090 (0.0472)	-0.0783 (0.0627)	0.0426 (0.0423)	-0.0056 (0.0515)	-0.0336* (0.0180)	-0.0727** (0.0318)
Black	0.3122*** (0.0682)	0.2307** (0.0906)	0.3068*** (0.0612)	0.1997*** (0.0744)	0.0053 (0.0260)	0.0310 (0.0459)
Income <u>2/</u>	0.0032 (0.1511)	0.2992 (0.2007)	-0.0207 (0.1355)	0.0750 (0.1648)	0.0239 (0.0577)	0.2242** (0.1018)
Income squared <u>3/</u>	-0.4536 (0.7512)	-0.9123 (0.9977)	-0.4199 (0.6736)	-0.4333 (0.8191)	-0.0337 (0.2868)	-0.4789 (0.5059)
Household size (Inverse)	0.2251** (0.1074)	0.2354* (0.1427)	0.2216** (0.0963)	0.2353** (0.1171)	0.0034 (0.0410)	0.0001 (0.0723)
Guest meals	0.0380** (0.0187)	0.0493** (0.0249)	0.0216 (0.0168)	0.0242 (0.0204)	0.0164** (0.0071)	0.0251** (0.0126)
% Age 0-2	-0.3849 (0.2362)	-0.6071* (0.3137)	-0.3080 (0.2118)	-0.4844* (0.2575)	-0.0769 (0.0902)	-0.1228 (0.1590)
% Age 3-12	-0.3939*** (0.1368)	-0.4315** (0.1816)	-0.2832** (0.1226)	-0.3068** (0.1491)	-0.1107** (0.0522)	-0.1247 (0.0921)
% Age 13-19	-0.3505** (0.1425)	-0.3133* (0.1892)	-0.3499*** (0.1278)	-0.3587** (0.1554)	-0.0006 (0.0544)	0.0455 (0.0959)
% Age 20-39	-0.2992*** (0.0739)	-0.2933*** (0.0982)	-0.3286*** (0.0663)	-0.3162*** (0.0806)	0.0294 (0.0282)	0.0229 (0.0498)
% Age 65 & over	-0.3225*** (0.0777)	-0.3081*** (0.1032)	-0.2776*** (0.0697)	-0.2488*** (0.0848)	-0.0449 (0.0297)	-0.0593 (0.0523)
Summary statistics: <u>4/</u>						
R ²	0.040	0.033	0.043	0.028	0.016	0.021
F-Income	0.154	2.899*	0.462	0.118	0.324	7.846***
F-Age Structure	6.057***	3.854***	6.760***	4.683***	1.911*	1.026
F-Region	2.258*	2.489*	1.681	1.289	2.942**	2.687**

See footnotes at end of table.

Appendix table 10--Spring 1977 Nationwide Food Consumption Survey, meat consumption regression equations 1/--continued

Item	Franks		Luncheon meats		Variety meats	
	Quantity	Value	Quantity	Value	Quantity	Value
Independent variables:						
Intercept	0.1833*** (0.0276)	0.2169*** (0.0294)	0.2597*** (0.0431)	0.3842*** (0.0623)	-0.0007 (0.0523)	-0.0102 (0.0322)
Northcentral	-0.0198 (0.0154)	-0.0370** (0.0164)	0.0921*** (0.0239)	0.0878** (0.0346)	0.0146 (0.0291)	-0.0032 (0.0179)
South	-0.0281* (0.0152)	-0.0506*** (0.0162)	0.0096 (0.0237)	-0.0493 (0.0342)	0.0164 (0.0287)	0.0139 (0.0177)
West	-0.0433** (0.0171)	-0.0694*** (0.0183)	0.0085 (0.0267)	-0.0113 (0.0386)	0.0074 (0.0324)	0.0049 (0.0200)
Rural	0.0021 (0.0123)	-0.0102 (0.0131)	-0.0040 (0.0191)	-0.0148 (0.0276)	0.0170 (0.0232)	0.0119 (0.0143)
Black	0.0635*** (0.0177)	0.0495*** (0.0189)	0.0798*** (0.0276)	0.0874** (0.0400)	0.3351*** (0.0335)	0.2217*** (0.0206)
Income <u>2/</u>	-0.0627 (0.0392)	-0.0391 (0.0418)	-0.1538** (0.0612)	-0.1685* (0.0885)	-0.0547 (0.0743)	0.0176 (0.0457)
Income squared <u>3/</u>	0.1890 (0.1950)	0.1484 (0.2079)	0.6636** (0.3041)	0.8888** (0.4399)	0.0560 (0.3693)	-0.1208 (0.2273)
Household size (Inverse)	-0.0032 (0.0279)	-0.0174 (0.0297)	0.0910** (0.0435)	0.1388** (0.0629)	0.1866*** (0.0528)	0.1000*** (0.0325)
Guest meals	0.0176*** (0.0049)	0.0209*** (0.0052)	0.0218*** (0.0076)	0.0326*** (0.0110)	0.0172* (0.0092)	0.0151*** (0.0057)
% Age 0-2	-0.0400 (0.0613)	-0.0768 (0.0654)	-0.0839 (0.0956)	-0.1773 (0.1383)	0.1258 (0.1161)	0.1187* (0.0715)
% Age 3-12	0.0092 (0.0355)	0.0091 (0.0378)	-0.0532 (0.0554)	-0.0735 (0.0801)	-0.0440 (0.0672)	-0.0301 (0.0414)
% Age 13-19	0.0419 (0.0370)	-0.0018 (0.0394)	-0.0477 (0.0577)	-0.1097 (0.0834)	-0.0164 (0.0700)	0.0212 (0.0431)
% Age 20-39	-0.0081 (0.0192)	-0.0150 (0.0205)	-0.0608** (0.0299)	-0.0658 (0.0433)	-0.0721** (0.0363)	-0.0383* (0.0224)
% Age 65 & over	-0.0551*** (0.0202)	-0.0568*** (0.0215)	-0.1662*** (0.0315)	-0.2473*** (0.0455)	-0.0168 (0.0382)	0.0155 (0.0235)
Summary statistics: <u>4/</u>						
R ²	0.027	0.027	0.033	0.033	0.068	0.076
F-Income	3.362*	0.941	5.862**	2.475	1.109	0.054
F-Age Structure	2.491**	1.857*	5.742***	6.171***	1.156	1.870*
F-Region	2.330*	5.549***	6.967***	6.384***	0.130	0.399

Appendix 10--Spring 1977 Nationwide Food Consumption Survey,
meat consumption regression equations

- 1/ The quantity and money value of meat are measured respectively in pounds per week and dollars per week of food used from home supplies. Sample means of the independent variables are: North Central, 0.2736; South, 0.3299; West, 0.1763; Rural, 0.2991; Black, 0.1167; Income, 4,456; Income Squared 31,650,000; Household Size (inverse), 0.4626; Guest Meals (per person), 0.5110; Percent Age 0-2, 0.0327; Percent Age 3-12, 0.1180; Percent Age 13-19, 0.0985; Percent Age 20-39, 0.2807; Percent Age 65 and over, 0.1777. *** denotes significance at the 1% level, ** denotes significance at the 5% level, and * denotes significance at the 1% level. Numbers in parentheses are standard errors of the parameter estimates.
- 2/ The coefficient on income and its standard error have been multiplied by a factor of 10^3 for convenience in presentation.
- 3/ The coefficient on Income Squared and its standard error are multiplied by a factor of 10^9 for convenience in presentation.
- 4/ R^2 is the coefficient of determination. "F" in F-Urbanization, F-Region, etc., denotes Fisher's F-test statistic which is used to test for significant differences within each reported category. The "*" denotes significance levels.

